



FRIDAY, AUGUST 10.

## The Howard Fry Fund.

At a meeting of some of the friends of the late Howard Fry, which was held in New York on May 17, for the purpose of expressing in some way their esteem for his character and the high regard with which they will always remember him, it was moved: "That the most fitting tribute to the memory of our deceased friend, and the one which would afford him the most gratification if he could know of what was done, would be the creation of a fund, by voluntary contribution, to be devoted to the education of his children." The motion to establish such a fund was unanimously adopted, and a committee was appointed to receive subscriptions to it, its final disposition to be determined by a majority of the contributors who may attend a subsequent meeting to be called by the Chairman of the committee.

The following are the names of the gentlemen appointed on the committee:

M. N. Forney, Editor *Railroad Gazette*, 73 Broadway, New York.

Coleman Sellers, of Wm. Sellers & Co., Philadelphia.

Charles Paine, General Manager, New York, West Shore & Buffalo Railway, Mills Building, New York.

Theo. N. Ely, Supt. Motive Power & Machinery, Pennsylvania Railroad, Altoona, Pa.

J. H. Belcher, Oils Iron & Steel Co., Room 24, Astor House, New York.

All persons known to be the friends of Mr. Fry were ad-

ing. The tread or rim is actually harder than the finest steel, thus enabling it to resist not only the wear upon the steel rail, but the still more destructive grip of the brakes, and its average life is not far from 100,000 miles of service. The process by which the hardening of the tread is produced is called chilling, and is somewhat analogous to the tempering of steel. A mold is made in sand from a wooden pattern, the moist sand is pressed by the molder against both sides of the pattern with a hand rammer, and it is then sufficiently tenacious to enable the pattern to be carefully removed without destroying the mold; this "sand mold" is inclosed in a ring made of iron called the "chill mold," whose internal face has been previously turned upon a lathe to form the tread and flange of the wheel; numerous air-passages, or vents, are made through the sand with a long needle to permit the gentle escape of highly explosive gases, which are formed when the molten iron is running into the mold; the stream of glowing fluid iron quickly fills the hollow space between the upper and lower sides of the sand mold, and running to the edge comes in contact with the iron ring, or chill mold; this being a much better conductor of heat than the sand mold, chills the rim of the casting, not only congealing the iron instantly, but causing it to crystallize (to a depth of about half an inch) in beautiful parallel filaments, as white as silver and nearly as hard as diamond. The portion of the wheel forming the plate or sides cools more slowly, is not chilled, and its texture is the same as that of ordinary cast iron. If the wheel is made of a mixture of iron which is too highly sensitive to the chilling influence, it will be too brittle for safety and too hard to permit of boring the hole in the hub into which the axle is to be fitted. If, on the other hand, the metal does not possess sufficient chilling property, the tread of the wheel is too soft and soon becomes flattened by its incessant pounding upon the rail, and then the wheel is useless. The margin between these two extremes is very small, and it is the daily aim of the wheel maker to steer between this Scylla and Charybdis.

to the wheel is then brushed off, and the wheel tested for strength by heavy blows with a sledge-hammer, and for hardness on the tread by chipping with a highly tempered cold-chisel; in this way any soft spots may be readily detected and the wheel accordingly condemned. There are, in fact, no less than 27 distinct diseases, so to speak, which a car wheel is liable to contract in the course of its manufacture, and it must pass a rigid inspection in the quarantine or cleaning shop before it receives the required guarantee of its maker that it is free from all defects.

Finally, having obtained a clean bill of health from the inspector, the wheel passes to the machine shop, where the hub is bored out, the axle fitted in by hydraulic pressure (of 15 or 20 tons) and the wheel and its mate are ready to start out on their long journey. If they are well matched they should roll along through their whole life without jarring, and, barring accidents, will often travel 150,000 miles before becoming completely tired out.

The chilled cast iron car wheel is a purely American invention, and the method of annealing, which alone made this process practicable,\* was devised by a manufacturer in this city as long ago as 1847, since which time between one and two million wheels have been made in the works established by him, and have been shipped to all parts of the world where the shriek of the locomotive whistle has penetrated.—*Philadelphia Ledger*.

\* (?)

## Early Locomotives on the Baltimore &amp; Ohio.

The engraving presented herewith is an accurate representation, taken from a photograph, of one of the "grasshopper" engines built for the Baltimore & Ohio Railroad nearly 50 years ago. These engines did good service in their day and survived until long after other and improved types of locomotives had been introduced on the



BALTIMORE &amp; OHIO "GRASSHOPPER" LOCOMOTIVE AT THE CHICAGO EXPOSITION.

vised of this action, and most of them responded very liberally. The subscriptions, however, at the present date, amount to somewhat less than two-thirds the sum which it was proposed to raise at the meeting of May 17. As there have been frequent inquiries concerning the fund from friends of Mr. Fry who were unknown to the committee and were not advised of the action taken at the meeting referred to, this announcement is published for the purpose of making it known to such persons that subscriptions will be received by any of the members of the committee from any one disposed to contribute. The sums subscribed vary from \$5 to \$1,000. Checks should be made payable to Mr. Charles Paine, Treasurer of the fund.

As it is proposed by the committee to invest the money subscribed at an early date, subscriptions should be sent in as early as possible.

## The Genesis of a Car Wheel.

It is estimated that there are ten million car wheels whirling over this country at the present moment, conveying millions of passengers and more millions of tons of freight to and fro across the continent at an average speed of 25 miles an hour for passengers, and often forty miles. How many of the hurrying multitude who trust their lives on the rail pause to consider the admirable mechanism by which these great results are accomplished? How many complex problems have been solved in the gradual evolution of the old-time stage coach into the modern iron horse and his train?

Take, for example, a car wheel, one of the simplest parts of a railway train; it is merely a round piece of iron, and as we generally see it covered with dirt and grease, having nothing attractive or ornamental in its appearance, and seemingly gross in its construction; yet that smaller and more valuable disk, known as "Uncle Sam's" double-eagle, which issues from the Mint glittering like a mirror, does not involve in its manufacture more intricate, and, in some respects, more delicate manipulation than this same gross car wheel.

The most important difference between a car wheel and any ordinary machine or apparatus made of cast iron, is the fact that the tread of the wheel, viz., that part which runs on the rail, is quite different in character from the plate or main body, though cast from the same metal in one pour-

ing. It must not be supposed that all irons possess this chilling property, for it is a comparatively rare one, and little is known, even among the most expert iron-masters, of the causes which produce it. Very recently some light has been thrown upon this subject by the aid of chemical analysis, and scientific investigation will doubtless reveal still more clearly what is as yet but dimly seen. Pig iron is not a simple substance, but is in reality an alloy composed of at least half a dozen different elements, each one of which helps to stamp its character upon the metal. It has been found, for example, that the substance silicon, which is always present in pig iron, exerts an extraordinary influence upon its chilling power, and a variation of less than 1 per cent. of silicon is sufficient to make or mar a car wheel; indeed, it has happened that an entire day's work of several hundred men has been spoiled by an excess of one-half of 1 per cent. of this substance creeping undetected into the mixture. The method of analyzing the iron to ascertain the proportion of carbon, phosphorus, manganese, sulphur and silicon which it contains is too complicated to admit of a general description; suffice it to say, that a few grains of a sample are reduced to fine powder, weighed upon an extremely sensitive balance, treated with acids and other re-agents, or tests, by which means each element is separated from its partners, and its weight ascertained. In a wheel foundry the iron is commonly melted in a large furnace called a cupola, capable of melting 50 or more tons a day. Anthracite coal is used, and a strong blast of air from a pumping engine creates an intense heat. As the iron melts it collects in a pool at the bottom of the furnace from which it is drawn into an immense ladle or cauldron, sometimes holding fifteen or twenty tons, from this it flows into smaller ladles holding just sufficient molten iron to make one large wheel.

Great skill is required in pouring the iron into the mold—it must be just the right temperature and it must be allowed to run into the mold with just the right force; otherwise a bad casting is the inevitable result. After the wheels are taken out from the molds, they require to be thoroughly annealed, as they are subjected to an immense strain due to the more rapid cooling of the chilled tread. For this purpose they are either put into pits previously heated or buried in hot sand, where they are allowed to remain for several days. In this way the molecules (or smallest particles) of the metal gradually arrange themselves in new positions and the strain is entirely removed. The sand which adheres

road, and four of them are still in use. One of them—the "Arabian"—was exhibited at the Chicago Exposition of Railway Appliances, and was of much interest, not only as an example of one of the earliest types of the locomotive, but also because it is, we believe, the only locomotive in the world which has been in actual service nearly 50 years (it went into service in July, 1834), and is still in good condition.

In this connection it has been thought well to reproduce the letter from the late Benjamin H. Latrobe, which was first published in the *Railroad Gazette* of March 8, 1873, and which contains an interesting history of the efforts made to secure reliable motive power on one of the earliest of American railroads. Mr. Latrobe's letter is therefore given as follows:

PHINEAS DAVIS AND THE "GRASSHOPPER" ENGINE.  
BALTIMORE, Feb. 4, 1873.

TO THE EDITOR OF THE RAILROAD GAZETTE:

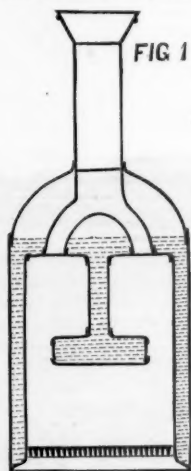
As I have undertaken to gather for you what information may be within my reach respecting the design and construction of that form of the locomotive engine first used some 40 years back for the regular and efficient traction of trains upon the Baltimore & Ohio Railroad, and which has been popularly known as the "grasshopper" engine, I have prepared the following brief memoir upon the subject, which embraces all that I have been able to collect in regard to it. It is indeed to be regretted that the history of a machine of so original and remarkable features should not have been earlier written, and while the facts and circumstances connected with it were fresh in the recollection of those concerned in its production. Happily you have succeeded in securing the very accurate drawing of it, of which you have sent me a copy in the excellent wood-cut now before me, and as there are one or two of the engines themselves still surviving and at work in the company's yard at their Mount Clare station in transporting material from one point to an-

other of its extensive area, the memory of this interesting and useful machine is not likely to be lost. This odd nickname of the engine requiring some explanation, it may be well to say here that it grew out of the manner in which the piston rods were connected with the cranks by means of lever beams attached to the boiler, and from which long connecting rods passed down to the cranks so as to resemble the hind legs of a grasshopper. A glance at the drawing will show the likeness plainly.

I will gladly perform the part now assigned me of assisting to save it and the name of its meritorious originator and his associates from oblivion.

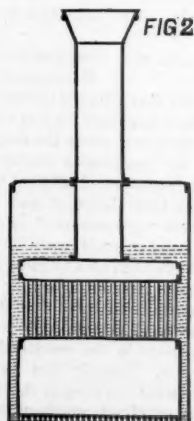
The "grasshopper" engine was not the very first locomotive which ran upon the Baltimore & Ohio Railroad. The company, after the example of the Liverpool & Manchester Railway, having advertised in 1831 for an engine which would, upon a level grade, draw a gross load of 15 tons at a speed of 15 miles per hour upon their road, as then constructed with a sharp rail and frequent curves of 400 feet radius, upon which the successful experiments of the previous year with the Peter Cooper locomotive had satisfied them that steam power could be employed.

Four engines of various models (among them a rotary) entered into the competition, but the only one of the four which proved equal to this moderate performance was that of Davis & Gartner, two machinists of York, Pennsylvania. The performance was not, indeed, accomplished without certain modifications having been made in the machine, as mentioned by the late Jonathan Knight, then Chief Engineer of the company, in his annual report of that year. The changes made are not specially described by Mr. Knight, but from a recent conversation with Mr. Ross Winans, I learn that the Davis & Gartner engine, named the "York," as it came from the shop at York where it was built, had a boiler of a form resembling somewhat the accompanying sketch (fig. 1), in which a pipe was dropped



down from the upper or crown sheet of the fire-box, and a flat cylindrical drum called a *cheese* attached to the lower end. I am not clear about how the top of the boiler was shaped, but suppose it may have been as shown, so as to give steam room and allow the smoke and flame to pass out. The smoke escape may have been differently connected with the fire-box, and so as to pass immediately out therefrom at the front or back of the boiler, and without going through the steam chambers as shown; or, if carried through that chamber, it may have been in a single pipe on one side of the *cheese* pipe, instead of in a double pipe branching as shown.

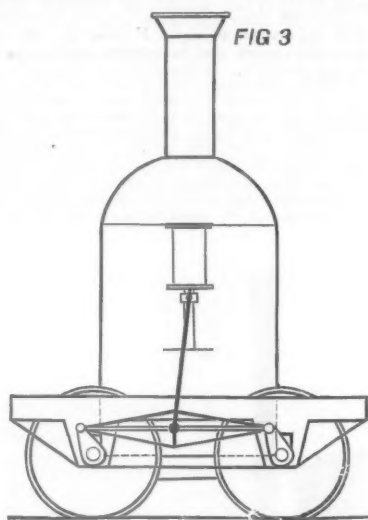
The defect of the Davis & Gartner boiler was a want of fire surface and of circulation of water in the *cheese* and its pipe. The supply of steam was therefore deficient, and the deposit of sediment in the *cheese* could not be removed. Hence another form of boiler had to be chosen, and the tubular one of the little Cooper engine, which had done so well the year before (1830), and the patent right of which was purchased of Mr. Cooper by the company, was adopted, and made the chief feature of the improved machine of 1831, called the "Atlantic," as shown in the sketch (fig. 2). Both



the *cheese* boiler and the tubular boiler are upright. The dimensions of the former I have not the means of giving, but it must have been much the smaller of the two. Those of

the latter are shown on the sketch, from which it will appear that its outside diameter was 51 in., and that of the fire-box 46 1/4 in., with a height of 22 in.; the length of the tubes 16 in., their inner diameter 1 1/2 in. at lower end and 1 1/4 in. at top, and their number 283. Immediately above them was an air chamber, of the same diameter with the fire-box and 6 in. high. The space thence up to the top of the boiler was 22 in., and the smoke, etc., passed up to the chimney through a cylindrical flue 13 in. in diameter. The water line was three or four inches above the air chamber, so that there was a steam space 18 or 19 in. high, and of the whole horizontal area of the boiler, less that of the flue just mentioned.

The improvement in the form of the boiler was thus very marked. Another feature in which the Davis & Gartner engine was modified was the mode of connecting the pistons with the road wheels, which, as Mr. Winans informs me, was as shown in the sketch (fig. 3). The cylinders, upright



in position, were attached to the sides of the boiler, near its top, and connecting rods carried down from the cross-heads of the pistons and outsides of the frame to the middle of the trussed horizontal bar, connecting the cranks of the road-wheel axles, which projected through the frame. This arrangement was novel and ingenious, but it worked badly, in consequence of the action of the springs, due to the inequalities of the track and the alternating vertical movement of the pistons, and there were other objections to it. To what extent in time the "York" actually did service upon the Baltimore & Ohio Railroad cannot now be accurately known, as there are but three persons likely to be informed on this subject now living, or at least accessible to me (Mr. Winans, my brother, and myself), whose connection with the company dates so far back; and after taxing my own memory and conferring with my two surviving contemporaries, I cannot answer the question. It appears, however, from a reference to the reports of the Chief Engineer, Mr. Knight, and the Superintendent of Machinery, Mr. Gillingham, that this experimental engine, having undergone the "modifications" above mentioned, although not specifically described, was found capable of conveying 15 tons 15 miles an hour on a level, and, being employed upon the 13 miles between Baltimore and Ellicott's Mills, about five miles of which distance ascended at about 17 ft. per mile, it usually performed the trip in an hour with four cars (4-wheeled), or about 14 tons gross load. The wheels were cast-iron, 30 in. in diameter, the axles revolving in friction wheels of the Winans patent. Spur and pinion gearing (the pinion on the axle of one of the road wheels) was used to increase velocity, and a speed of 30 miles per hour was attained upon straight lines, and 15 miles through curves of 400 ft. radius. The fuel was anthracite coal, and draft sufficient to burn it obtained by a fan blast. The weight of the engine was but 3 1/2 tons, and hence its insignificant tractive power. The "cheese" boiler was perhaps retained in the "York," but the cylinders must have been removed from their position on each side of it and placed in front, so as to connect with the spur and pinion gearing on the axle of the road wheel, instead of the trussed side bars above mentioned.

This is all the extant information within my reach in regard to it, and I gather from the reports referred to that, after working awhile, it was laid aside by its builders, who employed themselves in the construction—in their shops at York, Pa.—of the "Atlantic," which they placed upon the road about Sept. 1, 1832, and which was the first "grasshopper" engine, although not the full-fledged machine to which that apt yet somewhat grotesque sobriquet was subsequently, and ever since applied.

I would here remark that although the mechanical firm by which these engines were built was that of Davis & Gartner, the prominent member was Phineas Davis, to whom the credit of their design is chiefly due. In the modifications already mentioned of the experimental engine "York," Mr. Ross Winans, then in the employ of the railroad company as Assistant Engineer of Machinery, took part, as he subsequently did in planning the details of the "Atlantic," and in bringing the "grasshopper" engine to its matured form and proportions, in which it became for some years the sole motive power of the road.

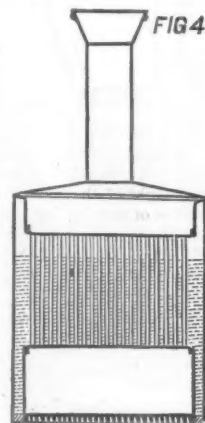
The "Atlantic" was a great improvement upon the "York" in all respects. It weighed 6 1/2 tons with fuel and water, or nearly double the weight of its predecessor, would consequently draw a much heavier load, and, being geared by its

spur and pinion so as to make two revolutions of the road wheels to one of the cranks, its speed was proportionately great, for which its tubular boiler and fan blast for its anthracite coal fuel, afforded abundance of steam. It was indeed chiefly designed for speed in propelling passenger trains, and hence only one pair (the front one) of its four wheels was used as drivers, on which pair nearly two-thirds of its weight was made to rest. Its cylinders were 10 in. in diameter, with a stroke of 20 in., the driving-wheels (of cast-iron with chilled rims) 36 in. in diameter, but, being geared, as just stated, they had an equivalent diameter of 6 feet.

The performance of the engine, as calculated in detail by Mr. Knight in his report of Oct. 1, 1832, was a gross load of 50 tons from Baltimore to the foot of Parr's Ridge, a distance of 40 miles, against an extreme grade of 37 feet per mile and curves of 400 ft. radius, and with an average speed of 12 to 15 miles per hour in the ascending direction, with of course a great increase of load and speed on the return trip.

The actual work usually done by the "Atlantic" was fully up to Mr. Knight's calculations; but the engine being the first built of her model, many of the parts were found too weak to bear the strain to which they were subjected upon a road of slight construction and abrupt curvature, and hence she was at first often out of order. Her spur wheel, working into the pinion immediately on the driving axle, wore irregularly, and sometimes broke from the jars encountered on a rough track, and this was so serious a source of trouble that in the next engine a separate axle was placed on the frame, which carried the pinion as well as the spur wheel, and they thus worked smoothly with each other; and, there being cranks on the end of this axle, and connecting rods coupling them with the driving wheel cranks, as shown in your woodcut, the difficulty was obviated altogether by this arrangement. The fan was driven by the exhaust steam which operated on vanes upon the same axle with the fan, inclosed in a distinct chamber, and constituting thus a species of rotary engine attached to the back of the boiler.

The pressure of steam was ordinarily 50 lbs. to the square inch (about the same as that used in English locomotives at



that time, but since greatly exceeded in both countries), which was sufficient to slip the driving wheels when the adhesion was one-eighth of the weight upon them. The valves were worked by a *cam* so shaped as to cut off the steam at about two-thirds of the stroke.

The daily expense of the round trip of 80 miles was \$16, which included one ton\* of anthracite coal at \$8; engineer, fireman and laborer, \$3.50; oil and packing, 50 cents; estimated wear and tear and interest on cost, \$3; water station expenses, \$1. The engine did the work of 42 horses, the daily expense of which was estimated at \$33, so that the cost of conveying passengers by steam (not including track repairs) was but half that of animal power, although the speed was nearly double.

The first cost of the engine is not stated in the reports, but is believed to have been about \$4,500, at that period of low prices of labor.

Mr. Knight, in his report of 1831 upon the "York" engine of 3 1/2 tons, had expressed the opinion that 4 1/2 tons (of 2,240 lbs.) should be the limit of weight of a new engine; but he gives good reasons in his report of 1832, just quoted, why he was satisfied that the 6 1/2 tons of the "Atlantic" was not too great (as it effected transportation with much greater economy), notwithstanding its more severe pressure upon the strap-rail track. In this we see the first step toward that vast increase in the weight of the locomotives at which we have now arrived.

While the first "grasshopper" engine was thus running to and fro between Baltimore and Parr's Ridge, another engine was in progress upon the same general plan, but with the view of hauling freight rather than passengers between those points. This engine, although intended to be somewhat lighter than the "Atlantic," had more effective power, in consequence of all the four wheels being connected by outside cranks and rods, so as to give it the adhesion of its entire weight. Its piston rods were also connected directly with the road wheels, the axle of the front pair of which was cranked, the gearing of the "Atlantic" being dispensed with, as a slower speed was proposed in the "Indian Chief," as it was called. The crank of the axle breaking, however, and the engine not working

\* When the year's account was made up the engine was found to have used 190 tons of coal in running 13,280 miles, which would give a ton for every 62 miles, or about 1.3 tons per 80 miles.

in some respects as well as the "Atlantic," it was decided to apply similar gearing to it; but, in order to avoid the difficulty already mentioned as due to the position of the pinion upon the axle of the road wheel, the separate shaft upon the frame, as above described, was adopted, and used in all subsequent engines of this model. The "Indian Chief" came out of the shop in October, 1833, under the name of the "Traveler." It was built and remodeled at York, like its two predecessors, the Baltimore & Ohio Railroad Company not then having shops in which such work could be done, but which were erected in 1833 as appears by the report of George Gillingham, Superintendent of Machinery, dated in October of that year.

The boiler of the "Traveler" resembled in the main that of the "Atlantic." The interposition, however, of the air chamber and the smoke flue between the top of the tubes and that of the boiler made it difficult to get at the tubes for their removal and repair. In the third engine, which was placed upon the road in July, 1834, and called the "Arabian," the tubes were lengthened from 16 in. to 31 in., and passed up to within 11 in. of the top of the boiler, the head of which was sunk to that extent to receive them. The water line stood 6 to 7 in. below the tops of the tubes, which therefore occupied that much in height of the steam chamber, the remainder of the steam room being in the annular space of 11 in., thence to the top of the boiler. This space would have been so constructed as to have led to *priming*, but for the drying of the steam and its partial superheating by its exposure to the tubes and the upper interior shell of the boiler, which made a hot-air chamber opening at the top into the smoke stack. It was apprehended at first that the tubes might be damaged in the upper part of their length not surrounded by water; but the fear proved unfounded. The tubes indeed proved, contrary to expectation, in view of the frequent bursting and rapid wear of tubes in the English locomotives, the most durable part of the interior of the boiler. Their upright position saved them from scale deposit, and the superior circulation of the water, common to all vertical, as compared with horizontal boilers, kept their lower ends nearest the fire always supplied with the cooler water, which tended, by its greater weight, toward the crown of the fire-box. The constant up-and-down flow of steam and water among the tubes kept them on the outside not only clean, but smoothly polished, while their upright position prevented any lodgment of soot or dust on their inside; hence their remarkable durability. As a drawback, however, upon this advantage of a vertical position of the boiler, the deposit of sediment and scale upon the crown-sheet of the furnace must be mentioned, which it was troublesome to remove. The greater height of the centre of gravity and the constant unsteadiness of the upright compared with the horizontal boiler, made it less suited to the locomotive engine, and, indeed, when it is considered that the "grasshopper" engine rested on wheels but about 4 ft. from axle to axle, and that the vertical action of its pistons and connecting rods was communicated to its springs, it is remarkable that it kept upon the rails so well at the considerable speeds at which it was run, with a galloping sort of gait, not wholly unlike the leaping of the insect from which it borrowed its name.

In the "Arabian" the waste steam was carried to the fan chamber by a hollow belt winding round the boiler, and within it the feed-pipe was contained, so that the water was thus heated before being pumped into the boiler. An arrangement was also made by which the exhaust steam might be either thrown into the fan chamber wholly, or in part turned into a waste-pipe, so as thus to regulate the draft of the furnace at pleasure.

The "Arabian," the cylinders of which were 12 in. in diameter by 22 in. stroke, was of nearly the same weight with the "Traveler," both of them weighing about  $7\frac{1}{2}$  tons, or a ton more than the "Atlantic." The weight of the "Arabian" was, however, more equally distributed upon its four wheels, on each of which it was then thought not allowable to put two tons—and prudently enough, too, considering the character of the track, which, however, was much more securely tried afterward, before it gave place to a better one.

The "Arabian" and all the succeeding engines of its model were built in the shops of the company, in Baltimore; and by Mr. Davis,\* under a contract with the company, up to the time of his death, which occurred on Sept. 27, 1835. He had built six additional engines, making nine in all of his construction, besides the "York," his first attempt, and he was upon a trial trip with the latest completed under his own direction when he met his death in the manner detailed in the following notice of it in the ninth annual report of the directory of the Baltimore & Ohio Railroad Company, which I extract in the words of the report. After stating that on the day preceding the one on which he lost his life the new engine "Washington," weighing 8 tons, had drawn upon the Washington branch of the road a gross load of 113 tons over the road, and up the grades of 20 feet per mile for several miles in succession, at a speed of not less than 10 miles an hour, the report proceeds to say:

"When adverting to what has been accomplished in the improvement of the locomotives of the company it would ill become the board to omit paying a tribute of merited respect to the memory of Phineas Davis, the lamented individual who so largely contributed to the results here indicated. On Sept. 27 last he, having completed a new engine, availed himself of the occasion of trying it to take his numerous workmen on a visit to Washington. On his return the engine, striking the end of a rail which the breaking of the iron chair had permitted to get out of alignment, it was thrown off the track and, being on the tender, he was dashed

\*I am not able to say whether Gartner was associated with him after he ceased to build engines at York, where their own shop was, but I think not.

forward against the engine and instantly killed. No other person was injured.

"Phineas Davis was the first who constructed an engine capable of being used on the road in which anthracite fuel was successfully employed. With untiring patience he bore disappointment after disappointment, and the eminent and splendid results which ultimately rewarded his efforts are ample testimonials of his genius, and will identify his name most honorably with that great system of internal improvement which is yet to work so many and important changes in the relations of society. Of a quiet and clear perception in matters relating to his profession, he possessed a calm, discriminating judgment. The warmth and energy of inventive talent were tempered by a prudent foresight, and great practical skill. He seldom, therefore, took a step which was not a secure one, and the success of his suggestions when put into practice gave them from the first almost the same weight as if they had been the dicta of experience. His private worth and unassuming manners were not less remarkable than his rare abilities. The board deeply regret his loss, and hold his memory in sincere and respectful consideration."

My own personal recollections of Mr. Davis fully confirm all that is here said of him. He was a man of middle stature, with a grave and thoughtful countenance and quiet deportment, and much esteemed by all who knew him.\*

After his death the company's shops were leased to Messrs. George Gillingham and Ross Winans, both of whom had up to that time been in the company's employ, in their machinery department. They continued (after completing two not quite finished by Mr. Davis) to build engines on the "grasshopper" model, placing 10 of them (including the two just named) upon the road in 1836 and 1837, making 17 in all, and so satisfactory was their performance that it rarely happened that more than one or two were in the shops at one time for repairs. There was also one built for the Paterson & Hudson River Railroad, and which plied between Paterson and Jersey City, with favorable results, for some years. Two engines of the same pattern were built by Charles Reeder in 1835, one of which exploded its boiler and was wrecked. Of the other I have no reliable account. Twenty engines of this model were therefore built altogether. The improvements upon the engine as left by Mr. Davis chiefly consisted in details relating to the steam and exhaust openings, and pipes and action of the slide valves, which continued to be worked (instead of the usual *eccentric*) by *cams*, of which there were two upon each shaft, differently shaped, so as to cut off the steam at various proportions of the stroke of the piston, the cam yoke being arranged so as to shift laterally by means of a lever worked by a treadle under the foot-board.

In his annual report of October, 1836, Mr. Knight speaks of these improvements as the result of the experience gained so far, and he gives detailed statements of the work performed by the engines (which more than bear out his previous estimates), and an elaborate and very favorable comparison of it with that of the English locomotives upon the Liverpool & Manchester Railway, as described in the then recently published work of the Chevalier De Pambour.

In that report Mr. Knight mentions that Gillingham & Winans have matured a plan by which the vertical position of the cylinders will be changed to horizontal, retaining the upright boiler, which could be set some 10 in. lower, and the centre of gravity of the whole machine be lowered about a foot, the object being to obviate the effect of the vertical movement of the pistons upon the springs and track, and their more elevated attachment to the boiler. Three engines were accordingly built upon the new plan (the separate shaft and gearing being also retained), but only one of them was placed upon the Baltimore & Ohio Railroad. This engine weighed about 12 tons. The other two, of about 10 tons, were purchased by another company. As the Davis engine had been nicknamed the "grasshopper," so the Winans engine was called the "crab," from the position of the cylinders, which were attached to the *back* end of the frame, instead of the front, as usual, thus giving it the look of moving backward instead of forward. The altered position of the cylinders and some other modifications in detail worked well on the whole; but the new engine, being still supported upon only four wheels with axles about 4 ft. apart, its movement, at speed, was unsteady compared with engines of longer stretch, and so the next effort of Mr. Winans, who had now established himself in shops of his own, was to get rid of this difficulty by multiplying the wheels and lengthening the engine, still keeping the vertical boiler. Some engines were built by him on this plan (I do not remember how many), and they were succeeded by still another form of locomotive, also designed by him, with horizontal boilers, of which 12 were furnished the Baltimore & Ohio Railroad, and performed well as freight engines, for which business they were exclusively intended.

Such is the history of the "grasshopper" engine, no more of which were constructed after 1837. They had done their part in introducing steam power upon a slightly-built and excessively-curved road (since much straightened), and they yielded place to machines better fitted for the increasing trade and travel of this growing country, requiring greater power, which could only be got by greater weight, and greater speed, only to be attained by a different form of locomotive. The policy of inviting native talent to compete in the design of an engine suited to the peculiar character of the road, and thus to begin at the beginning, instead of im-

\*Since writing the above, my friend, General Walker Gwynn, one of the fathers of the engineering profession in the United States, has informed me that he visited Mr. Davis at the company's shops at Mount Clare, while he was building one of the earliest of his engines, and that when he asked Mr. D. to let him see his drawings of the engine, the reply was that he had nothing on paper, but only an outline upon a board, on which, after working out the detail in his head, he traced it so as to measure the parts and make them fit with exactness. This reminds one of the great self-taught Brindley, who planned and built the Duke of Bridgewater's canal without the help of pen or pencil, it is said.

porting at once an English locomotive and adapting it to the road, was much criticised at the time, and the company's shops were derisively called "a shop of experiments." This was true in a good degree, but as the experiment resulted so well, the company might bear the reproach with equanimity. Its neighbor, the Baltimore & Susquehanna Railroad, did import an engine from England. It was upon four wheels, too, the hind pair being large driving wheels, the front being smaller ones; the two pair being set much further apart than the little 3-ft. wheels of the "grasshoppers," the engine would not run through the short curves of that road until the front pair was taken out, and a swiveling four-wheeled truck substituted, which was the beginning of the use of the now universal mode of supporting the fronts of our locomotives, excepting those designed wholly for freight transportation, all the wheels of which are mostly connected. The engine just mentioned burned first coke and afterward wood. The Baltimore & Ohio was not, however, the only company which thus in the outset encouraged native talent, as the South Carolina Railroad, one of the earliest of the country, opened with an engine designed by Horatio Allen (who still lives to enjoy his well-earned fame as an engineer), which had a provision for accommodating it to the curves of the road, having a swiveling truck under each end; revived of late years in the Fairlie engine.

My letter has reached a much greater length than I had intended, and I will conclude by summing up the chief characteristics of the "grasshopper" engine, and to what extent they belong to Mr. Davis alone, as far as that can now be known—giving due credit to those who were associated with him in bringing it to the perfection which it reached in the hands of Messrs. Gillingham & Winans, who succeeded to him as contractors for building them for the company (at a price of \$5,000 each). The engine was constructed, as has been said, with special reference to then weak track and strong curves of the Baltimore & Ohio Railroad. It was made, therefore, of moderate weight and short-coupled, so as to press lightly on the track and round the curves easily (the swiveling truck not having been then suggested), and that it must have done this last is proved by its being able to work itself through the quadrant of 60 ft. radius at the street corners. It was supported upon wheels of small diameter with the same views and to keep down the centre of gravity, and also to give tractive power with a cylinder of moderate size and pressure of steam, such as was used at that time. The upright boiler was adopted in view of the advantages already enumerated, and of its successful use in the little engine of Mr. Cooper, which seemed to give the maximum of steam generating capacity in the smallest compass, and hence to be especially favorable to the compactness required in so short an engine. The boiler, affording readiest and staunch support to the cylinders, was naturally resorted to for that purpose. This gave them their vertical position, and involved the lever beam and long connecting rods or grasshopper legs. The separate shaft was an accompaniment of the system of gearing required by the small wheels, and relieved of its objections.

The fuel used required a strong blast, and this was most effectively obtained by a fan, and this, again, was most readily driven by the exhaust steam which at the same time was made to heat the water before entering the boiler. The valve motion might have been effected by the generally employed *eccentric*, but the use of properly formed *cams* cut off the steam in a more satisfactory manner in this engine, and at a proportion of the stroke greater or less according to the power to be exerted on the different grades of the road, thus economizing steam. It must then be admitted that, taking it as a whole, the engine was admirably adapted to the road on which it ran, and although it had to give place, in time, to another style of locomotive, it rendered good service and is fully entitled to have its memory perpetuated.

To assign to each one who had a hand in its design and development his exact share is not now possible, for the reasons stated in the earlier part of this memoir. That the larger share is due to Mr. Davis must be conceded, and I understand it to be so by Mr. Winans, to whose advice and inventive talents, however, much of the credit of perfecting the machine is undoubtedly due. What part Mr. Gillingham may have taken I am unable to say; but he may have made practical suggestions in matters of detail. The melancholy circumstances attending Mr. Davis' death would naturally lead us, from sympathy, to award him rather more than less than his share. He appears, however, to have been without question the inventor, as he was the patentee, of the mode of driving, by the exhaust steam, the fan by which alone a draft strong enough to burn anthracite coal in that form of engine was produced. He also suggested the introduction of the wrought-iron ring into the cast-iron road wheel, by means of which the chill of the tread and flange was perfected and safety from the consequences of fracture secured. Messrs. Gillingham & Winans continued the use of both these inventions of Mr. Davis, and Mr. Winans, in his extensive operations during subsequent years as a manufacturer of locomotive engines and car wheels, continued the use of the ring.

The reputation of Mr. Winans as a mechanic and a man of versatile talents and pursuits is too well established and widely known, independently of his connection with the "grasshopper" engine, to need any aid from that source. The fame of Phineas Davis as a mechanical engineer must rest upon his large share in the design and construction of this machine, so original in most of its features; and hence, if he should appear even more prominent in this little memoir than the facts of its history would fully sus-

tain, could they now be all brought to light, no one, I trust, will suffer wrong thereby. I am indebted, as I have already intimated, to Mr. Ross Winaus, to the able reports of the company's Chief Engineer, Jonathan Knight, to my own recollections as Assistant Engineer, and afterward Mr. Knight's successor, and to those of my brother, who became Counsel for the Baltimore & Ohio Company in 1828, and still holds that office, and to whom, as Mr. Knight remarks in one of his reports, belongs the credit of suggesting embellishments in the external form and finish of the engines, in the improvement of which, although in a different department of the company's service, he took a warm interest.

BENJ. H. LATROBE,  
Formerly Chief Engineer of the Baltimore & Ohio Railroad.

### Contributions.

#### A New Ticket Swindle.

The New York Central & Hudson River Railroad Co.,  
Office of the Auditor of Passenger Accounts,  
New York, Aug. 7, 1883.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The perpetration of a clever swindle in a small way, evidently by some ticket "scalper," has just come to my notice. Among our collections of tickets issued by the Chicago, St. Paul, Minneapolis & Omaha Railway Company, of the "Stromberg pattern," we have found several, our coupons of which were originally made good from Buffalo to Suspension Bridge only, the printed arrangement of station names being made to cover points on our line as far east as Syracuse. By a mutilation of the coupons by the "scalper" and at the expense of the consecutive numbers (torn off), and partially of the form number as well, the true destination is changed, by the use ostensibly of a Stromberg punch, to Syracuse, and we lose by the operation nearly \$2.50 on each ticket.

Desiring, through the medium of your journal, to put railway officials on their guard against this new device for swindling their companies, I am very respectfully yours,  
C. H. KENDRICK, Auditor.

#### Formula for Frogs in Curved Track.

RICHMOND, Va., Aug. 6, 1883.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Frogs are not always to be fixed by the useful rule, "Twice frog number into gauge." This applies only when main track is straight.

When the main track is curved, the following general formula applies:

$g$  = gauge,  $d$  = diameter of curve of turnout,  $d n$  = that of main track,  $x$  = distance from heel of switch to point of frog measured on same main track rail as that on which frog is to be placed. Then

$$x = \left( \frac{g d n}{n \pm 1} \right)^{1/2}$$

Let  $g = 4.7$ , then

$$x = 2.17 \sqrt{\frac{d n}{n \pm 1}}$$

Example.—Turning away from main track curve: Let  $d = 955$ ;  $d n = 955 \times 3 = 2,865$ .

$$x = 2.17 \sqrt{\frac{2,865}{3+1}} = 58.06.$$

Example.—Turning in same direction as main track curve:

$$x = 2.17 \sqrt{\frac{2,865}{3-1}} = 82.02.$$

E. T. D. MYERS.

#### Toledo, Ann Arbor & Grand Trunk Securities.

Toledo, Ann Arbor & Grand Trunk Railway,  
No. 59 LIBERTY STREET, NEW YORK, AUG. 3, 1883.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In publishing this company's report for 1882 in your issue of this date, you state, when speaking of its bonds, that "the company is now trying to float an additional issue in London."

Knowing well that you never desire to give a wrong impression in any of your publications, permit me to correct this statement.

The bonds offered in London were for private account, and part of the first and only issue of \$1,260,000 first-mortgage 6 per cent. bonds by the company, and which have not been offered for sale until now that the road is completed and able to and has earned its interest.

This company and also the Toledo, Ann Arbor and North Michigan Railway Company, have been and are pursuing a most conservative policy, entirely opposed to the wholesale issue of securities recently so much in vogue. Neither company will issue preferred stock, income bonds or second mortgages, and mean to have the value of their respective roads represented by their first-mortgage bonds and common stock only.

I inclose copy of the prospectus issued in London, by Messrs. John Taylor & Co.

J. M. ASHLEY, President.

#### Educated Road-Masters.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your correspondent, signed "College Graduate," in your issue of July 20, has very fairly represented the experience of all well educated civil engineers who have tried to work their way smoothly on the railroads of the United States.

The principal reason for the prejudice, at least in the South, against college-trained men is that the superintendent

of divisions are nearly all men of very limited education, and having unlimited power, they cannot bear to have any man at the head of a department that knows any more than they do, or that will dare to have an opinion of his own.

Really there are no road-masters on Southern railways. They are only supervisors to jump about and do the bidding of their superintendents, be that right or wrong.

I know roads this minute where important iron bridges are rendered unsafe from want of paint, the corrosion having steadily gone on for ten and fifteen years. I know framed trestles, piled bents and many bridges in the most wretched and unsafe condition, yet the road-masters on these roads are helpless; the "ipse dixit" of the Superintendent has put the "quietus" on all outlay in the road department. The banks on nearly all Southern railroads are so washed and degraded that on many of them up to 25 ft. high the ends of the ties are unsupported; but let the road-master (should he be an engineer) propose to widen them or carry out any of the many absolutely necessary improvements, he is met with the "non possumus" of the all-wise Superintendent, who says: "You may have four men to each section of eight miles, and the section boss must work also. I may give you a gravel train next year, but any work that cannot be done with your present force is out of the question. You are too theoretical."

No doubt economy is very necessary in these days of bankrupt lines, but efficiency, or at any rate SAFETY, ought not to be sacrificed; and if the railroad commissioners have the power and do their duty, they ought to stop the traffic on many railroads (that carry a very high head at present) and insist on the bridging, etc., being put in a safe condition.

A SOUTHERN ENGINEER.

#### Train Dispatching Diagrams.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issues of the 13th and 27th of July, I notice articles on "A Diagram for Train Dispatchers," which, although theoretically perfect, if carried out practically would cause delay, confusion, and a vast amount of profanity. Mr. Appleton's plan is at a glance seen to be so cumbersome, that it needs only a passing reference. Mr. Fowler's method, while easier to handle, yet is open also to serious objection. It is, in fact, a second train sheet without any improvement on the original.

Take, for instance, a double-track road, 100 miles long, with 28 telegraph stations represented according to Mr. Fowler's plan. We will say this road has 65 freight and 15 passenger engines in actual use.

Three holes bored at each station would make 84 holes to insert the pins in. The pins would have to be shifted to each hole in turn, so that when these 80 engines had passed over the road once, the pins would have been shifted 80 × 28, or 2,240 times. A pin representing a train would remain at the last station reporting it until reported passing the next station, when the pin would be shifted. A similar process is gone through in marking the engine on the train sheet, so there can be no advantage in this respect.

Every time a train is entered on the sheet, he has to shift the corresponding pin, and in fact keep two train sheets instead of one. Does not this increase the liability to mistake? On a single-track road this would work still worse. Now, just suppose for a minute we are looking at a dispatcher working under this system. He looks over the operator's shoulder to ascertain what trains have left the terminus of the road, then looks for the corresponding pin. Of course it is the last one to be found, and equally of course he enlivens the monotony of the office by a few vigorous remarks. Perhaps he overturns the board, and extras, passengers, freights and specials lie on the floor in confusion worse confounded. Besides running this second edition of the train sheet, he has to keep a sharp lookout on his trains, issue numerous orders, see that too many trains do not run for a siding of limited capacity in order to lay off for a passenger train, see that the electric signals are all right in bad weather, regulate the making up of trains and distribution of cars, and do a thousand and one other things which use up time which is precious.

No, the board system might do for small roads, or roads where the traffic is so light that the dispatcher has time to play poker for drinks, but on a first-class, heavily burdened road, it would be kicked out, and denounced as an unmitigated nuisance.

H. T.

ALTOONA, Pa., July 31, 1883.

#### Railroads in Buenos Ayres.

[From a business letter we quote the following:]

The locomotive-builders of the United States should unite in publishing a few thousand copies of W. W. Evans' pamphlet, "Locomotivas, Americanas e Inglesas," and distributing them in Spanish-American countries. Europeans sell their engines here because they offer them cheap, and the native officers and managers are without information to guide them in the purchase of the best rolling stock—such as Evans' pamphlet would be.

The government has been trying to build some railroads on its own account, and has now run through 12 millions that were estimated as amply sufficient to build and equip a certain length of road, and asks for five millions more to complete it. It is asserted that competent and responsible contractors would have agreed originally to do it for eight or nine millions. It is probable that after this experience corporate responsible companies may have a chance at public work.

Had I the time I would "pirate" a good portion of Searle's "Field Engineering" and put it into Spanish to accompany

frog and switch tables—chords, tangents, versed signs and external secants. I have calculated in metres for working on the American system of field work, and with a 20-metre chain. The English plan is, you know, fractional deflections of a minute with instruments (not an even degree or fraction of a degree, as 2, 5 or 10 minutes). The native engineers generally use the French system of offsets from a tangent, which is only applicable on fairly smooth ground, and even then is not, as I claim, so rapid and accurate as deflections made with a transit. I don't claim to be wiser than the rest of creation; but when I know that our American style of field work is an improvement on what I see, I would like others to share in the benefit of it.

For pastime I accompanied an English expedition for a survey of 200 miles into the interior. I must say that I was not wonderfully impressed with the style of working on the instruments used in the work. Gurley makes instruments for pocket use, and for good work, that for convenience of manipulation and time of a field party saved in their use, are far in advance of anything European I have seen. The party would have saved time enough to have paid for two sets of Gurley's on the trip I speak of, had they been fitted out with them.

In this morning's paper, *La Nacion*, there is a savage article on the material and rolling stock purchased in Europe and shipped to this place for the government roads by a native agent sent to purchase and inspect. Some cargoes of engines and cars received have been condemned on reaching here. It is proposed to appoint a committee of investigation to see how far the government is committed by the action of its agent for the payment of this worthless stock, or how much the manufacturers have come short of the specifications: The dozen of engines now shipped by Baldwin for these same roads will probably arrive in time to make a good effect by way of contrast with the wheezy rattle-traps in use here.

One chief of the mechanical department of a railway here (native) objected to the use of American engines, because in case of collision "they did not have as strong underworks as European engines." Evidently in his judgment the wrought-iron frames of our American engines were not as strong as those of riveted plate-iron of European engines. I must differ with him in this view—in America we did not make engines with a view of testing their butting powers—like belligerent rams—but the questions studied were to get the greatest tractive powers, with the least cost of manufacture, consumption of fuel and cost of maintenance while in service, as well as long life in regular service. He readily admitted that such views were reasonable.

#### A Rejoinder for New England.

BOSTON, Aug. 8, 1883.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The complaint against New England for the prolonged detention of foreign cars has been so often and so fully stated in the columns of the *Railroad Gazette*, that a rejoinder is to be desired not only for the sake of the reputation of this section, but that the causes of mischief which are common to all parts of the railroad system may be fully apparent. New England, like the small boy, is in danger of getting more than a due share of blame belonging to the constitution of things, for which the larger members of the family are in fact responsible. New England is so small and compact a section, bounded on two sides by waters in which cars are in no danger of being lost, and upon another side by a territory (Canada) into which few cars enter, that the Car Accountant of a foreign road has no difficulty in placing a car which has once crossed the Hudson in an eastward direction. The New England Car Accountant has no such case in locating his cars which have crossed the Hudson in a westward direction. The two cases present differences corresponding to those described by an Irishman as, in his opinion, existing between the results of personal injury by a railroad accident and a steamboat explosion. "In the one case," said he, "there ye's are; in the other case, where are ye's?"

But although the Car Accountant of a foreign road is so sure that his car is "there," he is not always correct. New England has a back door (Fishkill) by which not a few cars escape, so that a large road may be crediting New England with 30 days' detention for each of a number of cars, when they have spent no more than 10 days in its territory. It is quite true that such a back-door method of returning foreign cars implies want of strictness in carrying out the rule that a car should return over the route by which it came; but in this respect New England is lax in common with nearly the entire railroad system.

It is admitted, however, that cars are improperly detained in New England, and perhaps in a larger percentage of cases than exists in other sections; but remembering the illustration of the small boy, one must be on his guard that an undue proportion of blame is not laid on the smaller and more offending member of the family.

Every one is looking after his own cars and giving small attention to those of his neighbors: cases for justifiable complaint against others are constantly before his mind, while cases of complaint against himself and his road are easily overlooked.

For example, taking one New England road: Three cars were delivered to the New York Central (& c., the entire West) in June, 1882, three more in July, 1882, another three in August, 1882, still another three in September, 1882, and an additional four in October, 1882; none of which have been reported as destroyed, and all of which may therefore be supposed to be somewhere on the lines of the American railroad system. These 16 cars are only

some of those on a list from which I quote. Now suppose that some Western road had sent on such various dates in 1882 800 cars into New England, and these had never been returned to the present time—the howl of complaint would be something fearful to hear. As there are probably fifty times as many Western cars entering New England as home cars leaving it, the percentage in the two cases would only be about equal.

It is admitted, however, that the detention of cars in New England is greater than that for other sections; but for this fact there are definite causes. The predominance of manufacturing is one. With such a net-work of competing roads, manufacturers are able to play off one railroad's laxity against another's stringent requirements, compelling one or the other to do its bidding for the sake of securing its freight. Perhaps, also, as is true in a few cases, the manufacturer is a director of one of the competing roads. Of course this is a guess, but not an ill-founded one.

The law of Massachusetts, and of some other of these states, prevents the exaction of demurrage; and this, I am convinced, is one of the fundamental causes of the difficulty. It is a matter of surprise that so able and active a railroad commission as that of Massachusetts should have so long neglected a subject affecting not only the interests of the entire country, but peculiarly those of New England roads. The roads of Northern New England have more cause for complaint of detention of their cars in the southern portion of the territory, especially at centres of manufacturing interests, than have Western roads; and a committee of an important society is at the present time seeking for some method of curing evils to purely local interests.

But all the enumerated causes of difficulty are equalled, or nearly equalled, by another for which the Western road is more largely responsible. Freight is shipped consigned to the consignor; the New England road receiving it may spend weeks in trying to find some local consignee, only to discover that their man is far away, and, as is finally proved, is waiting in hope of selling his goods before he unloads his car.

The committee of the society of which I have spoken were unanimous in the opinion that the detention of cars at terminal stations was in nearly every case attributable to the fault of the consignee or consignor, and not to the railroad companies or their agents. "Cars," says their report, "are received daily at all the principal shipping and manufacturing cities and towns in New England billed to order or consigned to the consignor, and weeks often elapse before the order of the freight is found and the cars unloaded. It is impossible in all such cases to store the freight, and all this time car agents and tracers innumerable are sent after the car, and the railroad company is held responsible for the delay in unloading it."

I have made up as strong a case for New England as the discovered facts would allow; because it is important that the present period of attention to the larger and common causes of this evil should not be allowed to pass over without some attempt, at least, at curative measures. The small boy should no longer bear the blame of errors due to the method of family government.

X. Y. Z.

#### Handling Freight in England by the Railroads.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The traffic in freight from any large manufacturing or commercial city is an object of much competition in England, as in most other thickly populated states or countries. And it will not be a matter of much wonder to any one familiar with city life to hear that in Liverpool nearly every large railway company in the kingdom has its goods-receiving warehouse, even though the nearest point of its own line be a hundred miles away from the docks. But in spite of all this competition, the old canals still keep a thriving business, as may be seen by looking into the terminus basin of the Leeds Canal, where a number of 30-cwt. hand cranes may be seen loading American and Egyptian bales of cotton or sacks of wheat into the old boats till they stand only a few inches out of the water.

Before attempting to describe the ways in which the English railways handle freight at their great terminal stations, it is necessary to have a clear idea of the rolling stock used. The simple yet all important difference with which we have most to do at present is in the *size, weight and shape* of freight cars, or wagons, as they are called in England. As to *size*, they seldom carry more than ten tons, except in the case of special cars for carrying boilers, locomotives or other heavy articles, which are made up to forty tons capacity. Then as to *weight*, they are very much lighter, a ten-ton car weighing less than five tons. And in *shape* they have four wheels, and do not measure more than 19 ft. over all, so that they can readily be transferred from one line to another either by turntables or small traversing tables. Box cars are seldom used except for specially valuable goods; the usual protection from weather and theft being a stout waterproof sheet covering the goods, and secured to the car all round. These box cars weigh about 75 per cent. of their maximum load, and ordinary open cars about 60 per cent. Keeping in mind the lightness and simplicity of structure of these cars, it will be understood how easily they are transferred from line to line, and how they are unloaded and loaded so quickly by means of cranes of all sorts in the large goods yards and warehouses which I am about to describe.

It would be very tedious to attempt to give a separate and complete idea of each of the large warehouses in a town like Liverpool. It would not be what I am aiming at; but as there are three distinct systems of working the machinery—

(1) by geared shafting, (2) by friction and (3) by hydraulic

power—it will be convenient to consider these systems in order, rather than describe each warehouse separately.

First, then, cranes driven directly by steam power are very rare, except in the case of a few cranes of large size on the docks, shear-legs and locomotive cranes, the latter of which are made up to four tons capacity, and are very useful over a large timber yard. But the risk of fire has kept them away from large warehouses, where so much valuable and inflammable material lies; and the steam power is generally confined to an engine and boiler-house, with a tall brick chimney, where either a steam engine is kept to drive the shafting, or pumping engines to supply the warehouses with hydraulic power. Besides elevators and cranes, there are still a great number of capstans, which are driven directly from the underground shafting by level gear; and these are very popular with the men who use them, because they will pull as many as forty wagons, while the hydraulic capstans pull only about twenty empty wagons. This preference is, however, a serious disadvantage, for the number of ropes which are destroyed, when strained to the full power of the main engine, is very large, whereas the same rope will last a very much longer time when used only with an hydraulic capstan. Another defect of the direct-gear capstans is that they are always turning, which is a source of danger and inconvenience.

Second. Friction is the medium of transmitting power from lines of shafting to cranes in many warehouses; and there are two systems of doing this, one in which the machinery is underground, and the other where it is placed in the roof. The former method is seen to advantage in the Canada Dock goods shed, one of the large terminal railroad sheds in Liverpool. On entering this, either from the dock at one end or from the town at the other, the lorries find themselves on a broad paved roadway, with a row of cranes down each side, beyond which are the lines of rails about six feet below the level of the roadway and cranes. These cranes, the jibs of which swing over the first line of rails and a considerable area of roadway, have a capacity of 25 cwt. and two tons, and are placed about 33 ft. apart along the two sides of the roadway. They are driven by friction from a line of shafting running underneath them, and which is easily accessible from the lower level of the railway. The machinery is very simple, the friction pulley for raising the weight, being geared to the winding drum, is pressed against the revolving shafting by means of a lever worked by a boy on the platform, another lever serving to operate a brake for lowering and stopping the crane.

The latter method of placing the shafting in the roof is more adapted to light lifts, of which there is an excellent example in the Lancashire & Yorkshire goods station. This consists of a large roofed area some 420 feet long. One strip of this shed is devoted to a receiving platform 5 ft. high, with nine jib cranes placed along it and driven by friction. But the other part is what I wish to draw special attention to. It consists of a covered paved area off the street, 420 ft. long by 120 ft. wide, through which four lines of rails pass. Attached to the roof, and vertically above each line of rails, is a row of jiggers placed about 25 ft. apart. There are 64 of these jiggers, each of about 10 cwt. capacity, and of the simplest construction. It consists of a simple winding drum between two lines of shafting which revolve in the same direction. One end of the drum is on a fixed journal, while the other end can be placed in frictional contact with either of the two lines of shafting by a lever, which is worked from a lightly built gallery running the whole length of the building, one gallery serving for two rows of jiggers. From this gallery the operator has an unobstructed view of all that is going on some 15 ft. below, and can therefore work his jigger to the best advantage. On each drum are wound two ropes in opposite directions, either of which can be used for lifting, at the option of the men below, so that in reality there are two lifting ropes every 25 ft., extending along nearly a third of a mile of line. The empty railroad cars enter at one end of this shed, and are loaded by the aid of one of these jiggers from the lorries or heavy teams which drive up alongside of them; and the cars when loaded pass out at the other end, drawn by capstans one by one into hoists, which lift them upon the upper level of the main line of railroad. It will be noticed that this shed is especially adapted to a few kinds of freight; sacks of wheat and bales of cotton being the chief traffic for distribution among the towns of Lancashire and Yorkshire. Gangs of three men will transfer from lorries into the railroad cars one bale of cotton per minute throughout the day, with the aid of these jiggers. And a similar gang of three men once loaded fifty sacks of wheat in twelve minutes; so quick and prompt are these friction jiggers when worked by a hand that is used to them.

The third system of working warehouse machinery, that by hydraulic power, is, however, the most generally adopted now in the erection of new warehouses and goods sheds of large size. And to take an example of one of the most recent, let us enter the Alexandra Dock warehouse, belonging to the London & Northwestern Railway. This is a very substantial brick structure, supported, with the exception of the outside walls, on iron columns, there being thus no division walls. The basement consists of a broad roadway opening into the street, two lines of railway, and a broad receiving platform, separating the latter from the former, and on which is placed a row of 30 cwt. hydraulic jib cranes toward the roadway, and the same toward the railway. The corners of the entrances and the bases of the pillars are well protected from any possible blows they might receive from entering or departing wagons, and everything seems built for strength and durability, which makes the

building look very well adapted to its purpose. Above the basement are four stories of fireproof storage room, each as large as the basement, which are reached by light iron stairways. In the roof are placed 27 hydraulic cranes firmly secured by timbers, each crane being placed vertically over a hatchway, which extends down through each floor to the basement. Nine of these cranes are above the rails, and the other 18 are above the roadway. And as each crane can be worked by a rope from either floor, there is a perfect system of communication between every part of the warehouse. These cranes are placed parallel with the slope of the roofs. The ram is forced upwards whilst lifting, and therefore sinks down into the cylinder again by its own weight, as well as by the tension of the chain. There are five pulleys on the cranes, so that the proportion between the lift of the crane and the stroke of the ram is ten to one, which causes the cranes to move very rapidly, though each of them is capable of lifting 30 cwt. The goods stored on these floors are of a miscellaneous nature, but the greatest strain expected is grain in bulk, the maximum allowable height of which is painted on each of the iron columns. It will be noticed that all the cranes in this warehouse are 30 cwt.; but there are other warehouses belonging to the same company not far off, where in addition to cranes of this and a lighter capacity, there are several five-ton hydraulic cranes and a few heavy hand cranes for exceptional use. Each of these warehouses advertises that goods and parcels are received and forwarded "to any part of the world." Attached to this warehouse described above is a large goods station, 800 ft. long, fitted up with hydraulic cranes and capstans, where freight is shipped direct without storage.

As I intend to return to turn-tables and the workings of a goods yard in a subsequent letter, let us leave them now and follow these cars of imported freight from the docks where they have been loaded, through the tunnels and other routes, which lead to the London & Northwestern marshalling ground at Edge Hill. This consists of an incline a mile and a half or more long, to the top of which all the trains which require sorting are taken by locomotives. Here the cars are left by the engines, and are run over what is called the *gridiron* by gravity; this being a long series of loop lines where cars can be detained until their turn comes to drop down and be caught at the bottom, with a brake van, or caboose at the end: thus forming a train ready to start away to its destination as soon as the locomotive is attached. There are many sorting yards throughout the country which are arranged on an incline allowing the cars to run down by gravity; but I believe there is none there which possesses greater facilities for sorting trains in the many opportunities afforded for picking out misplaced cars by means of the numerous loop lines; and also of passing the trains out at the lower end, thus avoiding the inconvenience and delay of drawing them up the long incline again against the stream of descending cars.

Having said this much about the facilities for handling freight in Liverpool, I hope, in a future letter, to speak of the warehouses in Manchester, where the traffic consists largely of heavy bales of manufactured dry-goods.

EDGAR WORTHINGTON.

#### Standard Reamers for Locomotive Work.

The following is the address delivered by Mr. Coleman Sellers before the Master Mechanics' Association at its recent convention in Chicago, on the subject of Standard Reamers:

MR. COLEMAN SELLERS said: When appointed to report upon the subject of the taper for reamers for bolts used in locomotive work, and a system of gauges to correct and maintain the standard when worn, I hesitated for some little time before accepting the task. In our own practice taper bolts have not been used in the manner contemplated in the report, but I felt able to consider the subject impartially, and so accepted the task. A mechanical engineer is likely to be interested in what tends toward uniformity in shop practice. As the commission given to me calls for a consideration of the taper of the bolts used in locomotive work, in the first place, therefore, it presupposes that taper bolts are a necessity. This may be perfectly correct. In our own practice we divide bolts into classes, and our rule is in every case where a through bolt, that is, bolt and nut, can be used, a through bolt must be used. If a through bolt cannot be used, then, if possible, use a stud bolt, and if that cannot be used, then as a last resort a tap bolt may be employed. The reason why the tap bolt is put last is because its nut is part and parcel of the machine itself. In the other two cases we have the nut upon the bolt or the nut upon the stud, and in the third case we have the wear-and-tear of a nut forming part of the machine. There are also slack bolts or loose fitting bolts and body-bound bolts. Slack or loose fitting bolts are put into holes  $\frac{1}{16}$  of an inch larger than the bolt itself. It is possible in fastening a machine together, whether part of a machine tool or part of a locomotive, to use slack bolts in combination with body-bound bolts, the latter serving as dowel pins to prevent side motion. With body-bound bolts, it is customary among machine builders to use a straight reamer and make a straight hole, and turn the bolt straight to gauge, so that it will fit its place. If the bolt is made perfectly straight and fitted into a reamed hole, it is an unsettled question as to how tight it should fit. In practice, the longer and larger the bolt, the nearer it is made to gauge size. A bolt so sized by gauge, as in a short length, to be a running fit, will seem very tight in a deeper hole. The difference between a tight and a loose fit is somewhere in the neighborhood of the ten-thousandth part of an inch. It is held by many locomotive builders, that the use of straight bolts is objectionable on the score that if they are driven in as tight as they say they should be, there is much difficulty in getting them out; that when they are taken out of a hole into which they have been driven two or three times they become too loose, and there is no means of making them tighter, resulting in their being discarded at the expense of making other larger bolts to be introduced in their place. There is no great difficulty about making two bolts of commercially the same size, but there is a vast difference between absolute accuracy and commercial accuracy. Absolute accuracy is a thing that is not attainable. Mr. Bond, from the Pratt & Whitney Co., who is present, knows this just as well as I do. I know how diligently the Pratt & Whitney Co. have labored to approach absolute accuracy in their

gauges, and how far they are in their own estimation from reaching that point, although they have reached a wonderful degree of perfection. What we have to strive for, then, is commercial accuracy. What system can we adopt that will enable workmen of limited capacity to do work that shall be commercially accurate? The taper bolt, for certain purposes, presents very decided advantages when considered in this relation. I have said that bolts may be made practically of the same diameter. Holes cannot be made accurately of the same diameter by reamers. Each reamed hole is only an approximation to correctness. We have here (showing) an ordinary fluted reamer.

A reamer is intended to produce a straight hole, but you will all admit that having passed this reamer once through a hole, the reamer must be slightly worn. The next time you pass it through it is a little more dull, and each time it is worse, the hole made by it must become smaller. There have been many attempts to produce a reamer which will be adjustable. Thanks to the gentlemen



Fig. 1.

who are now making such tools a specialty, there now has been added a very useful tool to the machine shop. Here is a reamer (fig. 1) made by the Betts Machine Company, of Wilmington. In this straight cutter blades are made wedge-shaped on their back edge, and are seated in wedge-shaped or taper grooves, to match the taper of the blades; these blades can be set to fit a standard gauge.

This will enable us to make and maintain a commercially uniform hole in our work. But the successful use of a reamer of this kind depends upon the drills that precede the reamer, being made as nearly right to size as possible; in other words, that the reamer has as little work given it to do as possible. The less you give a reamer to do the longer it will last and the longer it will maintain its size. The question of tapered bolts involves at once this difficulty, that we have to drill straight holes; then the tapered reamer is obliged to take out all the metal that must be removed in order to convert a straight into a tapered hole. The straight hole reamer is maintained to size longest by taking



Fig. 2.

out the least amount of metal. Hence it follows that the tapered reamer would be the nearest right for durability, which also would take out the least amount of metal. A short reamer like that (see fig. 2) will answer for a hole of a very considerable depth. It is only necessary that the length of the reamer shall be three or four times its own diameter. The Pratt & Whitney Co. has furnished me with reamers made for the Baldwin Locomotive Works. These are reamers that are to do precisely the work that we now have under consideration. They are to make a tapered hole, but you will observe the difference in lengths between the two. The straight  $1\frac{1}{2}$  in. reamer is say 4 in. long in the blades, the taper reamer is say 20 in. long.

Let us now consider the question of amount of the taper. No round piece of iron can go into a round hole in another piece of iron unless it is smaller than the hole into which it is intended to go. If it is in any degree larger it must compress the plug itself, or stretch the material that is around the hole. So if we adopt a tapered bolt we cannot fix upon a certain uniform distance that each and all bolts shall stand out before we begin to drive them. If the material is to be compressed, you will admit that there is a great deal more material capable of being compressed in a piece of large diameter than in one of small diameter. Metal is elastic; as long as we keep within the elastic limit of the metal, we are safe in assuming that it acts like a spring. In the large bolt and in the small one we have springs of different lengths. In the large bolt we have a long spring and in the small one we have a short spring. If we drive a bolt into a large piece of iron, it is the bolt which we compress; therefore the larger the bolt, the more the pressure we can give it to produce the required result. Therefore if we adopt any fixed taper for our bolts, we will have to use discretion, or go into an elaborate series of experiments, as to how far we should let our bolt-head stand away from the work before we begin to drive it. Now I find varying practice obtaining in locomotive establishments. There are some builders of locomotives (I mean connected with railroads) who put the straps upon their stub ends with tapered bolts, but do not use tapered bolts in any other parts of the structure. The Baldwin Works use tapered bolts wherever they require body-bound bolts. They make an universal taper of  $\frac{1}{16}$  in. to the foot in diameter. Suppose it is an inch bolt we are dealing with, and an inch bolt 12 in. long, and we started with an inch, and we ran it up to a taper of  $\frac{1}{16}$  in., it would result in this being  $\frac{1}{16}$  larger under the head than at the point.

They make all their bolts which are under 9 in. in length  $\frac{1}{16}$  in. larger under the head than the name of the bolt. Thus a  $\frac{3}{4}$ -in. bolt is made  $\frac{13}{16}$  under the head, provided that bolt is 9 in. long or under. Anything over 9 in. long is made  $\frac{1}{8}$  in. larger under the head and still made a taper of  $\frac{1}{16}$  in. to the foot. Most of the bolts used in locomotives are under 9 in. long. I have been shown bolts 20 to 22 in. long that were made a taper of  $\frac{1}{16}$  in. to the foot, and those were the bolts that fastened the saddle and the frame together; practically, however, the great bulk of bolts that are used about locomotives are those which are less than 9 in. in length and come under the category of  $\frac{1}{16}$  in. to the foot, and  $\frac{1}{16}$  in. larger under the head than the name of the bolt. A locomotive builder now in this city tells me that the specifications of engines submitted to him in many cases name the required tapers for all bolts—some call for  $\frac{1}{8}$  in. to the foot. The Pennsylvania road calls for  $\frac{3}{32}$  in. to the foot. All Baldwin locomotives are  $\frac{1}{16}$  in. to the foot. He tells me that the majority of the specifications, if they do prescribe the taper at all, ask for  $\frac{1}{16}$  with the exception of the Pennsylvania. The advantage of the  $\frac{1}{16}$  would seem to lie in the fact that a bolt headed in the ordinary manner can be made to fill the requirements, provided it is made of iron  $\frac{1}{16}$  in. larger than name of bolt. For the purpose of discussing this question at the present time it would be as well for us merely to adopt some taper which I should say might be  $\frac{1}{16}$  in. to the foot, and carry that through the system of gauges I propose to show you, so as to enable us to judge whether it is a practical system, and how far we can use it. If we shall decide that bolts should be tapered, for the reason that when a tapered bolt is driven into its place it can be very readily knocked loose, if that tapered bolt, when it is in, proves to be too loose, we have merely to turn out under the head and drive it a little further. These are arguments in favor of the tapered bolts, and show why it is an advantage to use them, their use rendering it easier to repair work that is secured by them than

work that has straight bolts. If we adopt a tapered bolt, and let us say with a taper of  $\frac{1}{16}$  in. to the foot, it is then well to make up our mind how we are going to make bolts, and bore the taper holes in a commercial manner: in other words, so that it can be brought into what we call the interchangeable system.

No matter what taper is adopted, either, by general consent uniform among the shops and the railroads or different in any of them, yet there is always the same need for a system of gauges to carry out the principle in each shop. The Baldwin Locomotive Works, having used the taper system for many years and considering it essential, long ago perfected a system of gauges which seem to me to meet the case. This system may be explained as follows:

For each diameter of bolt, and for all bolts under 9 inches in length, they keep in their store room steel plugs ground to a taper of  $\frac{1}{16}$  in. to the foot in length, and each standard plug is made at its largest end exactly  $\frac{1}{16}$  in. larger in diameter than the name of the bolt it represents. Thus for a one-inch bolt the standard plug will be on the taper part say 6 in. long, and one end of it will be  $1\frac{1}{16}$  in. diameter, and the other end will be 1  $\frac{3}{16}$  in. in diameter, a convenient milled handle being provided beyond the large end of the gauge, as in fig. 3.

To this standard plug is fitted a ring gauge or female

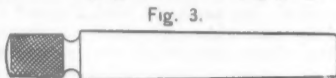


Fig. 3.

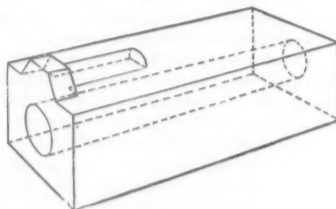


Fig. 4.

gauge of any convenient external form, which is in length the same as the taper part of the standard plug; so that when the hole and the plug are clean and dry, the one should just fit and fill the other and come flush at the upper end. These plugs and rings are to be retained in the store room as standard to try other gauges by. It is stated that the large majority of bolts used on a locomotive and made taper, can on the taper of  $\frac{1}{16}$  in. to the foot, be driven home if the size of the bolt and hole is such as will cause the head of the bolt to stand above the top of hole one-eighth of an inch, and when such a bolt has been driven home it will have compressed the bolt or stretched the metal into which it has been driven to the amount of .0065 in., and the fit will be almost as tight as are car wheels forced on to their axle in the usual manner. The gauges used by the workmen at the turning lathes for bolt work are made of cast-iron similar to the gauge described in connection with the steel plug, but are rectangular, so as to rest well on the lathe bed in a handy position for trial, and on each one of these gauges is cast the representation of one-half of the kind of bolt it is used for, as for example one for hexagon head bolt, and one for countersunk head bolts. See fig. 4.

The bench, or rather lathe gauge, for an inch bolt may be, say 6 in. long and  $2\frac{1}{4}$  in. square; the same sized casting, in fact, may be used for several sizes of bolts. These lathe gauges are reamed to such a size that the standard plug in the store room will be flush with the top of the gauge, precisely as is the case with the standard ring in the store room on the same plug. Bolts turned taper must fit this gauge with the head just touching the top of gauge, and without rattle or shake over the length of the gauge. The reamers used for tapering the holes in the shop should be not only long enough to enter the hole drilled and tapered to the required size, but there should be several inches left at the large end to allow for redressing; thus a one-inch reamer should be one inch in diameter at its small end, at one foot from small end it should be  $1\frac{1}{16}$  in. in diameter, and if beyond this it continues at the same taper, say three inches, it should measure  $1\frac{3}{16}$  in. diameter at its largest end. Such a reamer may be reground until its largest diameter has been reduced to the standard size. These reamers are guarded at their upper end by a collar driven on and covering the entire unused part of the reamer, which collar can from time to time be dressed off at the lower end to gauge, to keep the size correct. To adjust the reamers there are kept in the store room a set of rings, one for each size of bolt, which are so sized that the standard plug does not enter flush, but stands out one-eighth of an inch. It is well, too, to retain in the store room reamers not guarded at the large end, which can be used from time to time in retapering the gauges in use at the shop. Figuring or lettering on the gauges should not be on the upper end, as that part in readjusting requires to be turned away.

The same system of gauges for the bolts that are  $\frac{1}{16}$  in. larger under the head than the name of the bolt, and which bolts are 9 in. long or under, can be carried out in making the bolts that are  $\frac{1}{8}$  in. larger under the head and are 9 in. long. The outfit required, therefore, is for the store room: one plug gauge and one female gauge to match for each size of bolt, and for each kind of bolt, whether under or over 9 in. long; one ring or female gauge for the adjustment of the reamers, with the hole as much smaller than the bolt as will give the proper compression, and one standard reamer for the adjustment of the gauges. In the shop the gauges are female for the bolts and the guarded reamers for making the holes.

The taper bolt system calls for the use of two lathes to make each bolt, one to turn the cylindrical part for the screw thread and to square up under the head, the other lathe set to a uniform taper, not by the setting over of the head, but by means of some good former attachment, that will insure uniformity of taper regardless of the length of the bolt. In the first lathe the gauges used may with advantage be such as these very fine snap gauges made by the Pratt & Whitney Co., of drop-forged steel, or those made by the Betts Co., of Wilmington, Delaware. (Both makes of snap gauges were shown.) With a double ended gauge the cylindrical end of the bolt can be made ready for the screw lathe or the bolt cutter, and with the larger gauge  $\frac{1}{16}$  larger, the diameter under the head can be brought to size, and this sized part can be utilized to start the taper in the taper lathe, either starting the cut at that part or setting the tool to a stop screw in the rest at the large diameter, backing off and entering the cut at the small end of the bolt, and turning up toward the head. In practice it is found that the size and taper can be readily hit, and the gauge has very little wear from excessive use and repeated trials. When turned to size the bolt should fit the taper

gauge with no shake and the head just touching the end of the lathe. The inspector in the bolt store room should also examine the bolts with the taper gauge before putting them into stock. By means of the standards in the tool room the gauges for the lathe and the taper reamers can be kept to size. There are now to be had very convenient tools arranged for grinding the cutting edges of reamers to any required taper.

It is the practice with some users of taper body-bound bolts to only taper the holes to a depth equal to the thickness of the thinnest piece to be secured. As, for example, where the braces from the boiler are attached to the thick frame, they will ream the hole taper through the brace foot and for an equal depth into the frame, and while the bolt is made tapered down to the thread it will not fit the hole anywhere below the taper part of the hole. If a drill  $1\frac{1}{16}$  in. diameter be used to drill the hole for an inch bolt, and the drilled hole be reamed out to near  $1\frac{1}{16}$  at the top, the taper will be for a depth of 3 in. only; quite enough bearing to hold a foot  $1\frac{1}{2}$  in. thick in place.

Having described the system of gauges to you and explained some of the uses and advantages of taper bolts under certain conditions, I do not feel prepared to report in favor of any particular taper for such bolts. The question of uniformity of taper in the body of bolts, while it is of importance as tending to interchangeability, yet involves more important considerations than in the change of the threads used on the bolts themselves. The taper hole for the bolt in any machine becomes part of the machine. The bolt itself, a movable piece, may be put into such a hole with any one of a dozen kinds of threads cut on its end. The taper that has been already adopted in any shop or on any road requires that all future work shall conform to it.

If the Pennsylvania Railroad and all its branches have adopted  $\frac{1}{16}$  it is folly to ask them to change it to  $\frac{1}{8}$  in., because their own connections are large enough to make them independent of almost any other corporation, and the need of absolute uniformity in their work would cause them to stick to that particular taper. Any of you having five, six, seven, or two or three hundred locomotives must make up your minds what you will do. When we changed the standard for screw threads, a screw thread was adopted which had a manifest advantage. It is easy to adopt a screw thread. A bolt with any kind of screw thread can be used on any machine. But once having adopted a taper for the body of bolts on a road it is very difficult to make a change; and whether it is wisdom for this Association to say that any particular taper shall be the standard, is a question that I am entirely unable to answer. Therefore I am unwilling to recommend any taper to you, and only present the facts; but I will say that  $\frac{1}{16}$  in. is enough. The less taper you have the less material you have to cut away. But to say that  $\frac{1}{16}$  is preferable to  $\frac{1}{8}$  is folly, because no human being could feel the difference. If a bolt has 5 degrees taper it will set well; if it has 6 or 7 degrees it may jump out. Five degrees is about the angle of friction for iron. Five degrees would be an absurd angle for a taper. Any taper, then, that will hold the bolt when driven in, will answer the purpose. I think that the presentation which I have made, showing you a system of gauges which is already in use by those who have had long experience, may enable you to discuss the matter, so as to arrive at some conclusion as to whether you will adopt a uniform taper or whether you will let things go as they are. Nothing is more desirable than an interchangeable system; and while it is undoubtedly advantageous to make all parts of machines on the interchangeable system, yet in the matter of making holes to size there is a very good illustration of the difficulty enumerated taken from work with which I am familiar. In making turning lathes, the part that the longest resisted this uniformity was the sliding spindle of the dead head. Spindles may be made very close to size, but not so close but that each spindle must be fitted to place in the hole ground out to receive it, this for the reason that any shake or looseness other than that which will permit freedom of motion is detrimental, and it was not until the plan was adopted of arranging conical self-centering clamps to each end of the bearing of the dead-head spindle that such spindles could be made to gauge, and thus added to the list of the interchangeable parts of the machine.

In conclusion, it seems to me that the consideration of the uniformity of taper should be entered upon with caution; but from what I have presented to you as bearing on the facts of the case, you must be quite as well prepared to debate the question as if I had urged the adoption of any particular standard taper. If you do not see fit to consider the question, the system of gauges as used by the Baldwin Locomotive Works will enable those who desire to systematize their taper bolt making, and to carry it to a reasonable degree of uniformity in their shops.

#### July Passenger Meeting of the Joint Executive Committee.

The official report of the meeting of the Passenger Department of the Joint Executive Committee, July 24 to 27, is important as giving the action taken to prevent the neutralization of differential rates by the payment of commissions. We give in full the address of Vice-Chairman Pierson, which set forth the questions coming before the meeting, and the more important resolutions, with an abridged statement of the other proceedings.

#### ADDRESS OF THE VICE-CHAIRMAN.

At your meeting in Chicago in June, it was understood that a meeting would be held in July for the further consideration of the business transacted at that time, and in the hope that statistics might then be prepared for some of the proposed pools, which would enable us at this time to further the business which you there commenced. The magnitude of the work had not been fully comprehended by any of us, and I am only at this time able to report that one of the lines interested has sent in the full list of statistics called for.

The first matter for consideration is the extension of differential fares to points west of our territory on west-bound business, and to make such an adjustment of the rules heretofore agreed to as will cover the peculiar necessities of this business, some of which were not provided for when our rules were made.

It was intended (as in all previous agreements) that when these new differential fares were adopted, there should be simultaneously with their adoption a saving to the companies in commissions and expenses for securing business. The adoption of the differential fares seems to have been a device specially intended to supplant the payment of commissions wherever those differential fares should take effect.

The particular difficulty in applying the committee rule without modification to the business west of St. Louis and Chicago, which may pass indifferently through either point, or through intermediate points, is that the lines west of Chicago pay commissions which are sometimes more than enough to offset all the differences in the fares, whether by differential fares or otherwise, and thus disturb the volume of business of the St. Louis lines. It may be that commis-

sions on this business cannot in justice to the St. Louis lines be entirely abolished. It will be for you to consider what means shall be taken to fairly protect the volume of business of the St. Louis lines against the competition referred to, without at the same time encouraging those lines to adopt such measures as will radically subvert the methods you have entered upon. If commissions are to be paid by the St. Louis lines, it will be for you to determine under what regulations and checks these commissions are to be paid; whether the same shall be an arbitrary east of St. Louis, or whether the St. Louis lines, acting under the guidance of their local committee, may adjust a commission necessary to protect their business, as the necessities of the case may from time to time require.

The time required before entering upon a division of this particular business will be so long that it is desirable that the management of current business be arranged upon some agreed plan, which will answer a present purpose until such time as a division of the earnings may be put in force. After that is accomplished, the adjustment of these questions will be comparatively much easier.

At our meeting in Chicago, the Chicago & Atlantic road applied for the lowest differential fare awarded to any line between Chicago and the seaboard. Without any definite settlement of its status—without its becoming a party to the agreement for division of earnings, or in any other way placing itself formally by its own act in accord with the rules of the Joint Executive Committee, but simply considering that it was a new line which, by asking a differential fare, created the inference in your minds that it would accept differential fares and maintain them, their application was granted. The discussion, at that time, stated that it was for a temporary purpose, and as their business was more fully developed the matter would be subject to further consideration. Since that time, your Standing Committee at New York have received applications from the Baltimore & Ohio, Niagara Falls route, by way of the Wabash and Grand Trunk roads, for differential fares between Chicago and the seaboard. Some of the roads which constitute this line are already members of the Joint Executive Committee, while the Grand Trunk road at this time is not reporting its passenger business for division. The Chicago, St. Louis & Pittsburgh presents its application for differential fares from Chicago to New York, by way of the New York, Pennsylvania & Ohio and the New York, Lake Erie & Western roads on second-class business only.

It will be desirable for you to settle (if it is not already settled) the status which new roads applying for and accepting differential fares are to occupy with reference to the rules of the Committee.

There are a few cases of complaint of irregularities in fares in the territory of the Joint Executive Committee, arising under the sweeping rule adopted at Chicago, which I have held for the consideration of this meeting. If the complaints which have already been filed with me represent all the important cases, I am glad to inform you that their number is so small, and so little importance attaches to them as compared with the gross business you are all doing, that the general success of the movement is a proper cause for congratulation. The cases, however, will be considered in their proper order.

A memorandum of the miscellaneous business requiring the attention of the Committee should be presented to me, if possible, during the morning hour.

#### PROTECTION FOR THE ST. LOUIS LINES.

The Chair stated that the request of the trunk lines to Western roads in the territory of the Joint Executive Committee had not been generally acceded to, upon the ground set forth by the St. Louis lines that the roads west of Chicago were paying commissions so great that the lines west of St. Louis were unable to meet them without help from lines east of St. Louis. He asked what measures the St. Louis lines suggested as necessary for the protection of the volume of their business against the unnatural diversion referred to. A suggestion that the St. Louis lines be authorized to meet the commissions of their northern competitors was not favorably received. It was urged that one of the objects of the Committee's action was to abolish commissions between differential fare points, and not to authorize them; that authorizing a commission which could not be defined in amount, but was simply to be governed by the necessities of the case, placed it beyond the possibility of the Committee to control it, or prescribe its limits, and that in this particular it was impracticable without the ultimate destruction of the principles and methods of the Committee. The St. Louis lines being called upon, unanimously objected to that method of settling the question, and demanded of the Committee, without a dissenting voice, that the rules of the Committee already adopted be applied to all western lines.

An exhaustive discussion followed, after which the following resolutions were unanimously adopted:

*Resolved*, That the action of the trunk lines in establishing the differential fares from differential fare points in the east to all points west of Chicago and St. Louis, as described in Circular No. 13, Joint Executive Committee (Passenger Department) dated June 30, 1883, and the application of the rules of this Committee, regarding fares and commissions on such business, is hereby accepted and confirmed as the action of this Committee.

*Resolved*, That we insist upon the application of the rules of the Committee to the fullest extent, for the due protection of all our interests, and that all railway companies be required to refrain from the payment of commissions at differential fare points in the East upon any such business going west to the territory described in said circular.

#### RELATIONS WITH COMPANIES NOT MEMBERS OF THE JOINT EXECUTIVE COMMITTEE.

The following resolutions were presented, and after a long and general discussion, were adopted by a unanimous vote:

*Whereas*, Lines north of the Ohio River and east of the Mississippi, in the Joint Executive Committee or working in harmony with them, have pledged themselves to discontinue the payment of commissions on business westward originating at Boston, Albany, New York, Philadelphia, Baltimore and Washington; and

*Whereas*, A commission paid on such business by lines beyond the territory of the Joint Executive Committee interferes with the successful carrying out of this policy, and tends to destroy the effect of other agreements under which this Committee is working, and proposes to work; therefore

*Resolved*, That the Chairman advise all railway companies, interested in business west or south from the points named, of the objection on the part of this Committee to the payment of commissions at those points, and request them to conform to the rules of this Committee regarding commissions, rebates or other considerations to influence business, reduced rates to tourist agents or others, and the sale of tickets or orders of their own issue at the points mentioned, and inform them of the rules of the Committee regarding the same.

*Resolved*, That if any railway company persist after such notice in disregarding the rules of the Committee at any of the differential fare points mentioned, and the fact

is established so far as to convince the Chairman that the rules are being disregarded, then the rules of the Committee for such infraction shall apply generally in the manner following, to wit:

#### PROCEDURE FOR INFRACTION OF RULES.

*First*—All complaints shall be made to the Chairman in writing, accompanied with the evidence upon which they are founded.

*Second*—In the absence of more conclusive evidence, the purchase of a ticket or tickets at less than tariff fares, shall be sufficient ground on which to base a complaint.

*Third*—If, upon examination, the Chairman is convinced that a particular company has disregarded the rule, he may, in his discretion, (a) notify the offending company of his conclusions, and accept its explanations and assurances for the future; or (b), he may require that a particular form of ticket by the route upon which the irregularity has occurred be discontinued for a definite time, or until satisfactory assurances are given; or (c), he may require all lines issuing tickets from the points mentioned to discontinue the sale of tickets by the offending company's road for a specified time, or until satisfactory assurances are given; and if any company continues in disregard of the rule, the Chairman, with the concurrence of the Standing Committee, may require any or all lines in the Joint Executive Committee to cease interchange of passenger business with such company, as provided in the rules adopted Oct. 12, 1882.

*Fourth*—Whenever a complaint is so far established as to convince the Chairman that the rules of the Committee are being disregarded by a particular route, but the responsibility cannot be placed upon a particular company, it shall be the duty of the Chairman to require the withdrawal of all first and second-class tickets of that form by the offending route until the responsibility for the irregularity can be definitely fixed, or for such time as may, in his judgment, be sufficient to secure the future observance of the rule.

On motion, the following resolution was adopted:

*Resolved*, That the rules of the Committee concerning procedure in cases of irregularities, adopted for the conduct of west-bound business, be adopted for, and applied to, business from Chicago, St. Louis, Cincinnati, Louisville and Nashville to Boston, Albany, New York, Philadelphia, Baltimore and Washington—east-bound.

#### DIFFERENTIAL FARES TO SUPPLANT UNAUTHORIZED REDUCTION OF FARES AND PAYMENT OF COMMISSIONS.

*Whereas*, The award of differential fares is directly intended to supplant unauthorized reduction of fares and the payment of commissions as a means of securing business, it is therefore

*Resolved*, That with the adoption of differential fares between any two or more points, all commissions and reductions in fares usually offered to influence business shall be discontinued between such points, except as authorized by the Joint Executive Committee; it being understood that the acceptance of differential fares carries with it the unqualified agreement of all the roads interested to adhere strictly to this rule.

#### AWARD OF DIFFERENTIAL FARES.

The differential fare of \$16 second-class, Chicago to New York, was awarded to the line formed by the Chicago, St. Louis & Pittsburgh, the New York, Pennsylvania & Ohio, and the Erie, and the same and also the first-class differential fare to the new line from Chicago formed by the Baltimore & Ohio, the Wabash and the Great Western Division of the Grand Trunk to Buffalo and thence to New York either by the Erie or the New York Central.

The Indiana, Bloomington & Western and the Lake Erie & Western were authorized to make fares from Bloomington and Decatur, Ill., to Eastern differential fare points the same as from St. Louis by the same routes, and to base fares from Peoria on the Bloomington fares so made.

The Indiana, Bloomington & Western was authorized to apply the differential fares established between Eastern points and Bloomington and Peoria via the Lake Erie & Western to tickets over its road by way of Sandusky, Clyde, Urbana and Columbus.

Differential fares from Buffalo to Cincinnati, St. Louis and Chicago were awarded to lines terminating at Buffalo with the Buffalo & Southwestern and continued by the New York, Pennsylvania & Ohio, and also from Buffalo to St. Louis by the Lake Shore and the Lake Erie & Western.

The lines interested agreed upon a differential route from Cleveland to New York by the New York, Pennsylvania & Ohio and the Erie.

Applications for differential rates from the Cleveland, Akron & Columbus and several other short interior routes were received and postponed pending the collection of statistics.

The Chairman warned the Committee against a too free use of differential fares, lest confusion should result, and through fares be improperly affected.

There was discussion of complaints against the Buffalo & Southwestern and New York, Pennsylvania & Ohio, for selling tickets at less than tariff rates, which developed the fact that there was great irregularity in rates from Buffalo west by most of the roads. The differential rates awarded from Buffalo were intended as the first steps in the adjustment of these troubles, and as a temporary measure only.

Complaints were made that passengers holding second-class tickets were permitted to ride in first-class coaches on the Ohio & Mississippi and the Vandellia roads, and it was resolved that such passengers be confined to second-class or smoking cars, and not given the same accommodations as first-class passengers in the day coaches of express trains.

Complaints were made of the Pittsburgh, Fort Wayne & Chicago for running an excursion at reduced rates. That company agreed to obey the rule regarding this hereafter.

The Lake Erie & Western applied for reimbursement for losses which it claimed to have suffered by the arbitrary application of the Chicago rule, and it was asked to file its claim in detail.

The north and south lines carrying passengers between the lakes and the Ohio River were authorized to adjust their fares at their discretion to meet the competition of lines not in the Committee, except at those points where a reduction would affect east-bound and west-bound travel.

The Chairman was requested to call a meeting of the lines from Buffalo west at an early day to settle difficulties.

#### A Manufacturer's Arguments Against Pro-Rata Rates in New York.

At a meeting of the New York Railroad Commission in Auburn, July 17, Mr. G. W. Allen, Treasurer of D. M. Osborne & Co., manufacturers of mowers, reapers and harvesters, whose market is largely in the West and to a considerable extent in foreign countries, after describing the competition which his company had to meet, said:

"I will tell you why D. M. Osborne & Co. have been enabled to extend their business into every part of the world, wherever their goods may be required. Ten years ago,

when Mr. Rutter left the Erie road as its Assistant General Freight Agent, and came on to the line of which he now has the distinguished honor to be President, we were paying \$50 or thereabouts per car-load of our machines from Auburn to Buffalo, and we could either pay this rate or wheel them over to the Erie Canal. We also paid something like \$60 to get these same cars from Buffalo to Chicago. We now pay for this service \$35 per car from Auburn to Chicago, the difference in itself being a very respectable profit. This difference in cost to us for our goods laid down in the markets of the West has been used in extending our business, in paying the large expenses incident to it, and enabling us to compete upon more nearly equal grounds with the manufacturers of the different states in the West. At that time we made 8,000 machines per annum. This year we have had 31,000 machines in the market. Mr. Rutter's policy from the beginning was to do the business at the minimum of profit. In fact from 40 to 50 per cent. of their cars were going back to the West empty. The difference between 8,000 and 31,000 machines was a great item to this road, and it was not only the machines to haul away, but the material to build them with, nine-tenths of it coming from outside the state of New York. Substantially all our iron, all our coal, and 95 per cent. of our lumber comes from adjoining states. Then Auburn had a population of 15,000 people; now it has 25,000. By reason of liberal policy, the railroad companies of this state have had the benefit of the enormous growth of their local traffic.

In order to get full benefit of minimum freight charges, it is appropriate to state in this connection that the railroads at Auburn do not even furnish storage or track room for our empty and loaded cars at that station. We have these facilities on our own property. We load with our own labor more than 95 per cent. of all our business, into and out of our own warehouses. We use our own freight engine and crew for shifting and moving all our cars. We are just now incurring an expense of \$60,000 and within two months' time will complete a new railroad connection between our principal shops and the New York Central and Southern Central roads, which will be operated by our own power and labor. All these facilities for doing business we claim, and any intelligent railroad manager would admit, entitle us to lower rates than others not doing a similar service for the benefit of their own business. Under the resolution as referred to you by the Senate, no railroad company in the state would be allowed to take this into account or give us the proper difference or remuneration for what we do and which is ordinarily done by the railroad companies themselves. If you will go to Troy and call on the Messrs. Burden and on Mr. Corning, they will tell you that during these ten years the railroads have practiced the same liberal policy toward their business, with the same or better results to both parties. Come to Auburn and Mr. Sheldon for his axle works, Mr. Clapp for his carriage, hardware, rolling mill and lumber wagon business, also the Auburn Manufacturing Co. for theirs, will tell the same story. Ask Mr. Miller of Messrs. Kellogg & Miller, of Amsterdam, and he will tell you that they now use nearly 600,000 bushels of flaxseed a year in making a production of 7,000 gallons daily of raw and boiled linseed oil, valued at more than a million and a half dollars per annum. This flaxseed used to be obliged to go by canal boat from Buffalo and New York City, and in turn he had to transport the larger part of his manufactured oil by canal boats to New York and Buffalo. By fair treatment and liberal rates he has been able to double this business several times during the past ten years, until now, he tells me, he recently expended \$25,000 of his own money to connect his factories with the tracks of the New York Central company.

Other roads have been equally fair to their patrons, the Erie, the Delaware, Lackawanna & Western, and others constantly rendering increased facilities and reduced rates, in order to encourage and build up these local industries.

Very similar to our business in its results is that of the Oswego Starch Co. They consume several hundred thousand bushels of corn per year, which used to come by vessel down the lakes, but which is now brought largely by rail. Their manufactured product is consumed in each and every state in the Union; in many of these states in competition with local makers, who are enabled to sell at lower prices. Yet Mr. Kingsford has been enabled to double and treble his business, which never could have been done but for steadily reduced cost of transportation to him by the great trunk lines handling his raw and manufactured material.

I would like to inquire who and what class of the community demand a change so great as would be brought about by the enactment of a law such as this resolution would give us?

I quote from the resolution: "For freight, not through freight, shall be at *pro rata* rates, on its through freight rates with a charge not exceeding 20 cents per ton for loading and unloading local freight in all cases in quantities not less than a car-load and through freights under this section are defined to mean quantities not less than a car-load, to be carried from any terminus of any railroad, as aforesaid, to another terminus thereof."

Who can there be, I say, to demand such legislation? I am satisfied, and many of the principal business men throughout the state are equally convinced—and this is the great thing that troubles us all—that the New York Central can maintain itself even under the language of this resolution or a law similarly framed—at least so long enough to have the people of New York state come here, almost in a body, to demand the repeal of such a law, and I think this body would be largely made up of women and children but for the cost of their coming. For to a certainty the operatives of our workshops would have little to do, and none would be so deeply affected as their families. Under this resolution that road would immediately have to decide which it would serve, whether the through or local business. With the fluctuations in rates of the great through traffic from the East to the West and the West to East, few business men of this state could tell for any considerable number of days ahead what their local rates would be for business done inside of this state. When through rates were reduced, such a law would require also the reduction of all local or state rates. This would be imperative upon the roads. Does any one suppose upon the other hand that when through rates were advanced the companies from necessity, would not be obliged to advance local charges?

Certainly they would.

This would apply to all special rates, as well as to tariff rates. Nothing so much disturbs the business of those depending upon these lines for rates as fluctuations. When fair and allowed to remain stationary, everybody knows what they can safely rely upon, and can conduct their whole business on the basis of stability.

The permanent way on the Metropolitan Railway consists of 86-lb. bull-headed steel rails, in lengths of 24 ft., fixed in cast-iron chairs, that each weigh 48 lbs., by oak keys placed outside the rails. The chairs are fastened to transverse sleepers by two  $\frac{1}{2}$  in. tang bolts to each chair. The sleepers are of Baltic pine cross-sawn, 9 ft. long by 12 in. by 6 in., placed 2 ft. 8 in. apart from centre to centre throughout. The fish-plates are 20 in. long, and weigh 48 lbs. per pair, fastened by four  $\frac{1}{2}$  in. bolts.—*The Engineer.*



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#### EDITORIAL ANNOUNCEMENTS.

**Passes.**—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

**Addresses.**—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

#### HEATING CARS.

Although this may appear to be an unseasonable topic, yet summer is the time when plans should be matured and preparations made to meet the demands of winter, and probably there are now, or soon will be, a good many railroad managers who will be seeking an answer to the categorical question, "Which is the best car-heater."

The question appears to be more simple than it really is, because such heaters must, or should, not only supply a uniform and temperate degree of warmth to the whole car, but should have relation to provision for its ventilation, and it is also of the utmost importance that the heating appliances should not be liable to set the car on fire in case of accident.

Supplying a uniform and temperate degree of heat in a car is attended with very great difficulties, for the reason that the quantity of air contained in it is comparatively small and the surface of the windows exposed to radiation is very large, so that the temperature of the air is quickly raised or lowered. In the next place, the doors are often opened and large quantities of cold air are admitted at more or less irregular intervals. This cold air naturally falls, so that the lower part of the car is colder than the upper part. The writer has observed a difference of as much as thirty to forty degrees in the temperature of the air at the floor and at the ceiling. There is of course a tendency for the strata of air of varying temperature to mingle, but this requires considerable time, and it cannot be effected in a car in the short intervals of time between the opening of the doors. The temperature of the air can, however, be more or less equalized in any one, or all, of four different ways: first, the air at the bottom of the car may be warmed by means of steam or hot-water pipes at the floor; second, the air at the top may be cooled by admitting cold air near the roof; third, the hot air may be permitted to escape from the top; or, fourth, the cold air may be exhausted from the bottom. All of these plans are in use or have been tried with more or less success.

One great cause of complaint from the traveling public is the varying temperature in cars in winter. At times a vigorous fire will heat the inside to a torrid temperature, and then the fire will be allowed

to run down until passengers shiver with cold. No doubt this is largely due to the carelessness of attendants, but even when they are intelligent and careful it is obvious that the comparatively small amount of air contained in a car, if it is stagnant, will be quickly heated by a hot fire. If, however, there is a current of air flowing into and out of the car, the quickness with which it can be heated will be in inverse proportion to quantity of air which enters and escapes. In other words, good ventilation will have the effect of equalizing the temperature. It is, of course, true that more fuel will be required with good ventilation than would be needed if little or no fresh air is admitted, but in view of the importance of having pure air, this consideration should have no weight.

Of the importance of good ventilation at this late day it should not be necessary to say anything; and yet it is true to-day, as it was twenty or thirty years ago, that the great majority of railroad cars are very inadequately supplied with pure air in winter. An enormous and very discouraging amount of ignorance and prejudice still prevails with reference thereto, and must be taken into account in the consideration of this subject. Still, in spite of that ignorance, something may be done. Before this is possible, however, it is essential to eradicate the error so very commonly entertained, that a car or other apartment can be ventilated by simply allowing the bad air to escape and without providing means for fresh air to enter. It may be set down as an axiom that it is absolutely essential for good ventilation of cars that means be provided for the admission of pure air. A great deal has been written about the quantity required, but without complicating the question with calculations, it may be assumed that the larger the quantity of air admitted into a car or other apartment, the better the ventilation. A little is better than none, but much is better than a little. But taken in connection with the question of heating cars, we soon meet with limitations to the quantity which may be admitted. These limitations vary, too, under different conditions. Thus in very cold weather, when the temperature of the outside air is below zero, it would be impossible, with any ordinary heating apparatus, to warm a large quantity of air if it were admitted. It must be remembered, too, that at such times, owing to the great difference between the temperature inside and that outside, the movement of the air through every crevice and opening, at the windows, doors and ventilators, is very much more rapid than in moderate weather. In summer, when it is as warm outside as it is inside, open windows are needed to admit enough air. It will be seen then that it is essential to regulate the quantity of air admitted, and that a considerably smaller supply is required in very cold weather than is desirable when it is milder.

As one of the essential conditions of health and comfort is that there should be a uniform temperature in a car, it is obviously impracticable to allow a current of cold air to flow into it and come in direct contact with its occupants. The air should be warmed in some way before it reaches the passengers. To accomplish this end two systems are in use. In one the air before entering the car is brought into contact with the heating surface of the stove, and is warmed before it escapes into the car. In the other system the cold air is admitted at the top of the car, and mingles with the hot air before it descends on the passengers. Very satisfactory results can be attained by either of the two systems, especially if the warm air in the one case is conducted by flues along the bottom of the car, and is delivered at each seat by suitable registers; or, in the other case, if steam or hot-water pipes are placed near the floor of the car. Where the latter system has been used there has usually been inadequate provision for the distribution of the cold air. Unless it is admitted in many small currents, it is almost sure to be a cause of discomfort to some passengers.

With reference to safety from fire in case of accident it must be admitted that thus far there has been little satisfactory progress made in heating apparatus. We still have before us the awful possibility of being burned to death in case of accident, and are compelled from time to time to read the appalling accounts of such calamities. The two plans which have been employed to guard against fire in case of accident are, first, making the stoves of wrought iron and fastening them securely to the floor of the car, and, second, placing them underneath and entirely outside the car. The latter plan has for years been employed on the Philadelphia & Reading Railroad, with great success. In the Reading system the heating is done by convection, that is, the cold air is admitted to and is warmed by contact with the stove, and is then conveyed by suitable flues into the car. Mr. Baker has also recently

introduced a steam heater,\* which is suspended underneath the car in very much the same position as that of the Reading heater. The Baker heater has a conical steam boiler, and the heat is distributed through the car by means of steam pipes. Some difficulties were encountered when it was first introduced, which is not surprising; but it is said these have been overcome, and that it is likely to be extensively used during the coming winter. Placing the heater entirely outside of the car body no doubt gives a degree of security from fire in case of accident which no other plan does or can.

Nearly all the plans of heating cars either by warmed air or by steam in hot-water pipes are, however, open to the objection that they are more or less expensive. None of them is as cheap, nor as simple, as an ordinary stove, and all of them require more care and intelligence in their management. At the same time simply as a means of heating a car, none of them is any more effective than an ordinary stove; and most persons' experience has taught them that the simplest form of stove is usually the best heater. The objection to such stoves in railroad cars is that they are usually made of thin cast-iron plates, very insecurely fastened together, and in case of an accident, a slight shock will break them to pieces. It is true, too, that such stoves are liable to heat a car very unequally, that is, the air which comes in contact with them becomes very hot and then rises, while that near the floor remains cold. All this is true, but nevertheless it is worth while inquiring whether it is not possible by a modification of the simple and cheap means both to heat and to ventilate cars very satisfactorily, and at the same time do it with a very reasonable degree of safety from accident from fire. It will probably require no argument to convince most of the readers of this article that one of the most effective forms of heaters for either anthracite or bituminous coal is a common cylinder stove. If instead of thin cast-iron plates it were made of good ductile boiler plate, either iron or steel, obviously it would be less liable to be broken to pieces in an accident than a cast-iron stove. Its security would be increased by welding instead of riveting the longitudinal seam of the cylinder, and welding in the heads, as the air reservoirs for the Westinghouse brake are now made. The inside could be lined with fire-brick, or it could have a cast-iron fire-pot. It should then be bolted down, not with a few lag screws, but with strong  $\frac{1}{2}$  or  $\frac{3}{4}$  in. rods passing over the top of the stove and down through the floor, with proper nuts and washers underneath the sills. In order to protect the sides of the car from the heat of the stove it could be inclosed with a cylindrical casing made of tank iron, with a liberal space, say six or eight inches, between it and the stove. This might be open at the top and bottom, and the lower edge should be raised and have an open space between it and the floor of about six inches. The effect of this would be that the air between the stove and the casing would be heated and would rise and thus draw in the cold air next the floor, which in turn would be heated and would also ascend. Above the stove, and in the end of the car, above the end window, a suitable ventilator could be placed, with slats which incline upward, so that the current of cold air as it enters would be directed upward and would mingle with the ascending current of hot air from the stove, and would then be distributed through the car. The ventilator should be made so that it would be impossible to close it entirely, but some opening should always be left for the admission of fresh air.

This arrangement, it is believed, would heat the car very effectually, and with a reasonable degree of uniformity; it would give good ventilation, and it would be much less liable to set the car on fire in case of accident than the ordinary heaters, and lastly it would be cheap and simple. It is not claimed that the plan has all the advantages which some of the other systems possess, but it is believed that cars could be heated very satisfactorily with such an apparatus.

#### CHICAGO SHIPMENTS EASTWARD.

Chicago through rail shipments eastward, by the six lines in the pool, for the last ten days of July were 34,993 tons, which is at the rate of 24,453 tons per week. Of these shipments 14.2 per cent. went by the Chicago & Grand Trunk, 16.6 by the Michigan Central, 18.5 by the Lake Shore, 27.6 by the Fort Wayne, 13.5 by the Chicago, St. Louis & Pittsburgh, and 9.6 per cent. by the Baltimore & Ohio. Thus the two Vanderbilt roads together carried 35.1 per cent., and the two Pennsylvania roads 41.1 per cent. of the whole, against their 45.4 and 35.4 per cent. in the pool, which, however, may not apply to the July business.

\* Illustrated in the Railroad Gazette of April 28, 1882.

as the new apportionment, when made, will date from July 1.

The shipments of the last week of July for four successive years have been:

	1880.	1881.	1882.	1883.
Tons	34,371	59,370	19,634	24,453

This year the shipments were 4,819 tons (24 per cent.) more than last year, but 34,917 tons (59 per cent.) less than in 1881, when the low rates of the railroad war diverted traffic from the lake to the railroads, and 9,918 tons (29 per cent.) less than in 1880, when rates were a fifth higher than now.

For seven successive weeks the Chicago shipments have been, in tons:

	Week ending—					
June 16.	June 23.	June 30.	July 7.	July 14.	July 21.	July 31.
29,309	27,449	30,718	23,584	27,436	27,603	24,453

Thus no increase in shipments has taken place since June.

For the whole month of July the Chicago shipments have been, in tons, for five successive years:

	1879.	1880.	1881.	1882.	1883.
145,788	160,187	259,253	95,029	113,575	

Thus the July shipments this year were 18,596 tons (19½ per cent.) more than last year, but 145,678 tons less than in 1881, when the ordinary rate was 15 cents per 100, against 25 this year; 46,612 less than in 1880, when the rate was 30 cents, and 32,213 tons less than in 1879, when rates were low and irregular. The shipments in July last year were less than in any other month since 1878, which is as long as there has been any record; but with that exception the shipments were smallest last July—smaller than in May and June of last year, which next to July were the worst months on record.

There were, it is true, two roads carrying from Chicago this year which have not carried heretofore, and are not reported here with the pool roads, though they really belong to the pool, and will take a share of the traffic, dating from July 1. These roads carried about 20,700 tons in July. With this added we have the total through rail shipments eastward from Chicago in July 134,275 tons, or about 40,700 tons more than last year, but less than in any other July (since 1878 at least), and smaller than in any other month since 1878, except May, June and July in 1882 and May in 1880. In no way can it be looked upon as other than a bad month.

The earnings from the Chicago shipments in July for the five years at the current rates, counting all shipments as made to New York, were:

	1879.	1880.	1881.	1882.	1883.
\$581,144	\$960,924	\$777,760	\$473,195	\$567,575	

The earnings thus, though \$92,680 more than last year, were \$209,885 less than in 1881, during the railroad war, and \$393,049 (41 per cent.) less than in 1880, when higher rates as well as a large traffic contributed to swell the earnings, and a little less than in 1879. This decrease of earnings falls upon the six roads in the pool about in proportion to their percentages, though these have been changed somewhat since 1880.

For the seven months ending with July, the Chicago shipments have been for the last five years:

	1879.	1880.	1881.	1882.	1883.
1,631,930	1,314,766	1,628,789	1,101,768	1,293,472	

The shipments for the seven months this year were thus 102,704 tons (8½ per cent.) more than last year, 335,317 tons (20½ per cent.) less than in 1881, 51,294 tons (3.8 per cent.) less than in 1880, and 340,458 tons (20½ per cent.) less than in 1879. It would probably astonish most of those who do not study traffic closely to learn that the Chicago rail shipments were larger in 1879 (down to the end of July) than they ever have been since; and that it is a smaller and not a larger traffic which eight roads are dividing now than five roads carried then, for at that time the Chicago & Grand Trunk was not fairly at work. The year of greatest profit to the railroads was in 1880, however, and then the shipments were but a very little greater than this year; but then the winter rate was 40 cents, against 30 this year; the March rate 35 cents, against 30, and during the rest of the season the rate was 30, against 25, while expenses were less than now. There is a great difference in the time of the shipments between 1880 and this year. In the first three months of the year shipments were large without precedent this year. It is in the last four months that they have been small. Thus the tons shipped have been:

	1879.	1880.	1881.	1882.	1883.
Jan. to March	649,511	648,902	680,224	726,127	767,808
April to July	984,419	665,864	948,565	464,641	525,664

This year 50½ per cent. of the seven months' shipments were made in the first three months; last year 61 per cent.; in 1881 only 41½ per cent.; in 1880 48½ per cent.; in 1879 but 39½ per cent. Last year the heavy winter business was due to the extremely low rates which ruled in January and February; this year rates were as well maintained probably as in any winter, with the possible exception of 1880. The falling

off of shipments has been due chiefly to the lack of traffic, for while the lake vessels have carried more than last year, they have carried much less than in most other years.

After July we should feel the effect of the new crops, not only wheat but of corn, though no new corn will be shipped till December. Not much is to be hoped from the wheat crop, at least till spring wheat begins to come in, in comparison with any of the above years except 1881; but if corn continues to improve so that the farmers are satisfied that they will have a good crop, larger shipments of that great staple may be expected soon afterward. As, however, one of the chief dangers the corn has to meet now is frost (because even where it is thriving excellently it is generally backward), they may not count confidently on their corn crop until after the middle of September. Last year there was a large increase (43,200 tons) in August over July, due to marketing new wheat and oats; and yet shipments were larger then than in any previous August. We may reasonably expect to exceed the August business of last year, but will probably not come up to that of previous years.

It may be a question how far the Chicago shipments reflect the general course of through east-bound freight. Probably fairly well this year. The Chicago grain receipts, at least, have been an exceptionally large proportion of the total Northwestern receipts, and very little grain has been going down the Mississippi. Moreover, the Atlantic grain receipts have been exceptionally small for the last few months. For the four months ending with July they have been, in bushels:

	1879.	1880.	1881.	1882.	1883.
92,335,143	116,600,805	94,245,076	40,843,120	54,190,565	

Considering the out-turn of the crops last year we have reason to be disappointed with this result, the total cereal production for the last four years having been, in millions of bushels:

	1879.	1880.	1881.	1882.
2,686	2,704	2,034	2,098	

With an increase of 654 millions (nearly one-third) in the production, we were justified in expecting a larger increase in the grain movement compared with last year, when (in these four months) the quantity left on hand was extremely small, as the shipments in August and September (after the bad harvest of 1881) were really very large, as were also those of the first three months of 1882.

July is, perhaps, more nearly than any other the end of the Chicago traffic year. It cuts the year of corn shipments in two nearly in the middle, however. These are sometimes as large in August, September and October as in any other month. But, for reasons we have given, the shipments of corn even are largely determined after July by the prospects of the growing crop. We cannot now see a prospect of a large traffic from Chicago for the next few months, though it will doubtless be much larger than for the past few months. Until corn shipments begin on a large scale the shipments, we should say, are likely to be as small, except in August, as in any year since 1878.

#### Threatened Railroad Strike.

A strike of railroad telegraph operators was "ordered" this week by the head of the telegraphers' brotherhood, but in this case evidently he did not represent the men for whom he assumed to speak, for only a very small proportion of the operators obeyed the "order." President Sloan, of the Delaware, Lackawanna & Western Railroad, answered the "request," made for advances in wages very pointedly, declaring his willingness to inquire into any grievances complained of by his own employés, but refusing entirely to comply with the demand made, and saying that he did not believe that his operators were dissatisfied. The result indicated that Mr. Sloan represented his employés better than the "Master Workman" who assumed to speak for them, and who in this and other cases has apparently offered no evidence whatever that he is authorized to speak for those in whose behalf he has demanded higher wages. However willing the employer of a great force of laborers may be to confer and negotiate with their agent or representative, he can hardly be expected to treat any one as their agent who may claim to represent them, and would not be justified in doing so. A man who assumes to act for another should show his power of attorney.

Apparently there has been no disturbance of railroad service whatever by the defection of operators, though a strike was ordered on a number of great railroads. It was extremely improbable that a strike would succeed in the railroad service. The larger part of the operators employed on railroads are, as it were, apprentices to railroad service. They learn telegraphing not as a permanent occupation, but as one of the qualifications which will be of use in higher

positions, or will help to reach them. Because it is looked upon as one of the means of entering an occupation which furnishes a career in which there are many good positions and some great ones, there are many more applicants for places than there are places, the more so as some degree of facility in telegraphing may be acquired in a short time, so that the learner does not lose much if he does not continue in railroad or telegraph service. For this reason, the lower places in railroad (and probably in other) telegraph service can probably always be easily filled at low wages, and in the higher places, too, the wages are affected by the chances of advancement. A large number of superintendents were once telegraph operators, and though their expertness in this particular probably had not a great deal to do with their final promotion, the capacity demonstrated while telegraphing led to their employment in other positions where they obtained the other knowledge and experience which have qualified them to work a railroad.

But this time evidently is not favorable to an advance in wages. Two weeks ago we called attention to the fact that we have just passed through a period of extraordinary activity in business and demand for labor, during which it became almost impossible to recruit an underpaid occupation, because there were so many others open which offered greater advantages. In few occupations can the demand for labor have been greater than on railroads and telegraphs. Within three years we built more than 28,000 miles of railroad—increased our mileage about one-third. It has been necessary to increase the force of railroad employés immensely, and that at a time when the demand for labor in manufacturing industries was also unprecedented. Now neither railroads nor manufactures are growing at anything like the rate of last year and three previous years. The demand for labor is not nearly so great as it was. It is not so easy to get employment, and not nearly so easy to get a chance to learn an occupation, because fewer recruits are required.

New railroads which this year and last have been engaging a large force to work their lines, largely of skilled and experienced men, are able to fill their places with good men at the wages which the old roads are paying, and do it easily; the men seek the places, and the companies do not have to seek the men. When an entirely new company has applications from qualified men for twice as many places as it has to fill, it does not seem possible that an attempt to secure an advance in wages on the old roads can succeed.

The Brotherhood of Telegraphers has been discredited this week, not only by its apparently false claim to represent the railroad operators, but also by a claim that if the railroad operators struck the Brotherhood of Locomotive Engineers would strike also. Mr. P. M. Arthur, the chief of the latter organization, has taken pains to deny this. He affirms that his Brotherhood remains absolutely independent of all other trades-unions, and that the engineers would continue to run if the telegraph operators struck. The Locomotive Brotherhood is naturally somewhat sensitive on this subject, as it has heretofore suffered obloquy for the acts of other organizations. Probably to this day most people in this country suppose that it took part in the strike of 1877, which resulted in the riots at Pittsburgh and elsewhere, with which it had absolutely nothing to do.

Within the last few days the Telegraph Brotherhood has been further greatly discredited by the fact that the Western Union wires have been cut in many places, evidently by those familiar with the lines, and doubtless by some of the striking linemen. It is not at all probable that the Brotherhood, as an organization, authorized or connived at this outrage, but it nevertheless gets the discredit of it, as a small party of thieving stragglers may discredit a large and orderly army. Since the failure of the railroad telegraphers to go out, it has become apparent that it is scarcely possible for the Western Union strikers to succeed, and some of the linemen have probably got exasperated, and have done what makes their success still less probable.

#### Late Movement of the New Wheat Crop.

The new crop grain movement, which by this time, if the winter wheat is good, is usually large, has made very little progress so far this year. There is a slight revival, as there always is in the latter part of July, but the wheat movement is extraordinarily light—much lighter than after the very bad harvest of 1881 even. The shipments due to the new crop are first felt, naturally, in the southern part of the wheat growing territory—sooner at St. Louis than at Chicago, and sooner at Baltimore than at ports further north. In 1878, 1879, 1880 and 1882 there was an immense crop in this southern district, including the Ohio Valley, Missouri and Kansas. This year

the crop is very poor in the three states first named, which last year produced 141 millions of bushels out of the entire 504 millions of winter and spring wheat in the United States. This year, by the most trustworthy but not the smallest estimates, they have produced but 73 millions. Missouri also has a much smaller crop than last year, but Kansas, by the latest reports, has nearly as large a production. There is also a light crop in Kentucky, which, though never large as compared with that of the states north of it, has a considerable effect on the early shipments, because it ripens early. The crop is late this year, but it was last year also, and then it did not prevent large shipments in the second week of July.

The movement is felt first in the receipts of the Northwestern markets. To show what the course of these has been from week to week we give below the receipts of grain of all kinds at the eight reporting Northwestern markets (St. Louis, Peoria, Chicago, Milwaukee, Duluth, Detroit, Toledo and Cleveland) for the six weeks ending July 28 for the last five years, and for the seven weeks to Aug. 4 for all of them but this year:

Week to	1879.	1880.	1881.	1882.	1883.
June 23...	4,486,008	5,611,004	7,232,434	2,582,694	4,376,450
" 30...	4,398,973	5,117,800	7,649,571	2,310,613	3,904,292
July 7...	3,779,676	4,500,527	5,258,827	1,886,422	2,871,084
" 14...	4,250,273	5,798,152	5,105,048	3,333,226	3,021,566
" 21...	4,379,964	7,826,850	4,950,743	5,615,149	3,836,076
" 28...	4,851,503	9,393,826	6,722,873	6,017,729	4,185,257
Aug. 4...	6,702,732	7,262,397	6,052,700	5,774,769	.....

The last week given in this table for this year may seem long past, but the returns for the following week (ending Aug. 4) are not yet complete. So far as received they indicate an increase of about 676,000 bushels (70 per cent.) in wheat, but little or none in other grains, leaving the total receipts and even the wheat receipts small in proportion to those of previous years.

The new crop has little effect on June receipts, except so far as the prospect for an abundance on the contrary cause the farmers to sell or hold their surplus, and this has affected chiefly on corn and not on wheat, only a very small part of which is consumed on the farms where it is raised, while much the greater part of the corn is consumed there. The first week of July is likely to be the week of smallest receipts of the season, partly because it contains the Fourth of July, but partly also because it stands at the beginning of the winter wheat harvest, when the old wheat and oats are mostly marketed, the new is not yet ready to market, and the farmers are very busy in their fields.

In 1879 the after-harvest movement was comparatively late in beginning, but it averaged 6,632,000 bushels a week in August, more than 7,000,000 in September and 7,600,000 in October. In 1881 the June receipts were unprecedented, and in no week of July were the receipts small, though in the first three weeks they were much less than in June. Though the wheat crop was a failure, the receipts increased greatly after the third week of July, and for the eight weeks ending Sept. 18, they averaged no less than 7,161,000 bushels per week. At that time the low rates of the railroad war and very high prices for grain drew out the farmers' stock with extraordinary rapidity, so that for the rest of the year the receipts were exceptionally light. Last year we only had the wretched remains of the bad wheat and corn crops of 1881 to market until the abundant crop of new wheat began to come forward, which it did very rapidly, as early as the second week of July, the corn receipts in that month being extremely light, but the wheat receipts larger than in any other July.

The smaller grain movement this year is wholly due to lighter wheat receipts. But the decrease in wheat receipts is doubtless much more in proportion than the decrease in production, because there is not this year the scarcity of stocks in the East and Europe which made necessary early shipments from the new harvest last year. A few weeks more will show more plainly how far the smaller crop has reduced the wheat movement. Spring wheat will not begin to come forward until September, and not rapidly until the latter part of that month. Before that time the heavy crop of oats may make an impression on the grain movement, the more so because there is not a large supply of corn on hand.

#### The Late James Cooke.

Mr. James Cooke, well known as a locomotive builder of skill and experience, died Aug. 2, in the Adirondacks, where he had gone for his health. Mr. Cooke was still quite a young man, his age being only 46 years. He was born at Matteawan, N. Y., in 1837, but came to Paterson, N. J., as a boy, and there learned his trade in the locomotive shop of the then newly-established firm of Danforth, Cooke & Co., in which his brother, the late John Cooke, was Superintendent. In 1858, when just of age, he went to Scranton, Pa., where he remained for 10 years in the shops of the Delaware, Lackawanna & Western road, rising gradually to be Master Mechanic of the road. He left that position in 1868 and returned to Paterson, where he was appointed Superintendent of the Danforth (now the Cooke) Locomotive & Machine Works, and continued in that position until some 16 months ago, when he was chosen President of the company, to succeed his brother, John Cooke, who died a short time before. The change of position made little difference in his work, however, as he still continued the active superintendence of the works, when his health permitted.

Three years ago, when the erecting and some other shops of the company were destroyed by fire, Mr. Cooke caught a severe cold which settled on his lungs, and from the effects of which he never fully recovered. He had several times visited the Adirondacks in the hope of benefiting his health. The immediate cause of his death, which was sudden and unexpected, was hemorrhage of the lungs. He leaves a wife and three children.

Mr. Cooke was the youngest of four brothers, of whom the oldest, Mr. John Cooke, died last year; Watts Cooke is President of the Passaic Rolling Mill Co., and William Cooke is in the railroad supply business in New York. Their father, Mr. Watts Cooke, Sr., was for many years pattern-maker in the shops of Rogers, Ketchum & Grosvenor, now the Rogers Locomotive Works, and was considered a mechanic of exceptional skill.

Mr. James Cooke was not one of the pioneer builders who made the American locomotive. He belonged rather to the second generation, who were not called upon to originate, as were Thomas Rogers, Matthias W. Baldwin, Wm. Mason and their contemporaries. He was one of those whose place it was to follow in the steps of the fathers, improving what they had made and seeing that their machines kept pace with the increasing demand upon them. As the executive head of a great shop he was active, pushing and capable, controlling well the works under his charge and keeping up with the times, but not developing much inventive genius. His death, while still a man in the prime of life, will be mourned by many friends in Paterson and elsewhere.

#### Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

*Brunswick & Western*.—Extended from Albany Junction west into Albany, Ga., 2 miles. Gauge, 5 ft.

*Denver & Rio Grande*.—The *Del Norte Branch* is extended from South Fork, Col., west to Wagon Wheel, 14 miles. Gauge, 8 ft.

*Milwaukee, Lake Shore & Western*.—Extended from Three Lakes, Wis., north to Eagle River, 10 miles.

*South Carolina*.—A branch has been completed from Ten-mile, S. C., west to Lamb's, 3½ miles. Gauge, 5 ft.

*Houston, East & West Texas*.—Extended from Lewisville, Tex., west to Nacogdoches, 5 miles. Gauge, 3 ft.

This is a total of 34½ miles of new railroad, making 2,796 miles thus far this year, against 5,667 miles reported at the corresponding time in 1882, 3,115 miles in 1881, 2,631 miles in 1880, 1,278 miles in 1879, 947 miles in 1878, 845 miles in 1877, 1,145 miles in 1876, 594 miles in 1875, 913 miles in 1874, 1,966 miles in 1873, and 3,372 miles in 1872.

THE SOUTHEASTERN RAILWAY, OF CANADA, which has caused the failure of Mr. Bradley Barlow, its President, and of financial institutions with which Mr. Barlow was connected, is the Canadian portion of a line from Montreal to Boston, etc., the American portion of which is formed by the Passumpsic River Railroad, the Boston, Concord & Montreal, etc. What may be called its main line extends from Newport, Vt., northwestward 101 miles to the St. Lawrence at St. Lambert, opposite Montreal. Of this, however, the 21 miles in Vermont from Newport west to Richford is leased by the Southeastern Company, and also 36 miles at the Montreal end. But it owns besides a branch from a point 11 miles north of Richford (Canada line) nearly due north 64 miles and thence northwest 32 miles to the St. Lawrence at Sorel; and it leases a line nearly parallel with this most of its length but about 20 miles further west, extending from the Vermont Central at Stanbridge, which is 25 miles north of St. Albans and 8 miles north of the Vermont line, north 40 miles and thence northeast 22 miles to an intersection of the just-mentioned Sorel line at a point 21 miles southeast of Sorel. Then there is a third line from a point near Montreal northeast down the St. Lawrence to Sorel, 43 miles. Thus 120 miles of its road, including the larger part of the line which forms part of a route from Montreal to Boston, is leased. The part owned is 140 miles.

The company had \$1,750,000 of first-mortgage bonds, which it seems Mr. Barlow had taken as collateral for an advance of \$1,000,000. It reports that it had raised a subsidy of \$315,892 from the province of Quebec and \$418,000 from municipal loans. The funded debt was only at the rate of \$12,500 per mile, making the interest charge but \$750. What rentals it paid for its leased lines does not appear. For the year ending with June, 1881, its gross earnings were about \$1,574 per mile; the net earnings, \$406. The following year the net earnings were \$448 per mile.

The company's lines form a little system between the northern border of Vermont and the St. Lawrence, crossed from east to west by the main line of the Grand Trunk from Montreal to Portland and by the Northern (Canada) Division of the Central Vermont, while just west of it are the Grand Trunk's lines which connect with the Central Vermont. The Grand Trunk's traffic goes chiefly by the latter. The country on the lines of the Southeastern is poor, and there are no large towns in it. The Connecticut & Passumpsic Rivers road connects by a line of its own with the Grand Trunk for both Montreal and Quebec, and it is difficult to see where the Southeastern could get anything more than the light local traffic of the country on its lines. Even the Canadian Pacific, which had been negotiating for it, could not bring it much at present. But the possession of the Southeastern would give it a New England connection comparable to that of the Grand Trunk, and enable it to compete with that road (when the Ontario & Quebec road is finished) all the way from Detroit to Boston. It appears that the Canadian Pacific has all the Southeastern bonds as collateral for a loan of \$1,250,000 made to Mr. Barlow, and it is supposed that it will foreclose the mortgage and thus obtain possession of the road.

THE CANAL GRAIN MOVEMENT has been larger this year than before since 1880, but very much less than in that

year. The receipts by canal at tidewater down to July 28 for five years have been:

Days open...	1879.	1880.	1881.	1882.	1883.
Bushels received...	13,911,822	30,161,725	14,440,427	11,345,168	17,172,653
Av. per day...	175,833	310,675	197,814	103,167	206,900

Thus the average canal movement of grain per day was twice as great this year as last (when there was very little grain to move by any conveyance), and 46 per cent. more than in 1881, but one-third less than in 1880. Rail rates were demoralized during this period in 1879, and during 40 days of it in 1881, which greatly reduced shipments by canal, though in 1881 the lateness of the season tended to make them large, and the total June movement of grain was wholly unprecedented. In 1880 the rail rate was well maintained at 30 cents per 100 lbs. from Chicago to New York, and the canal rates were much higher than they have been in any of the other four years. Last year and this rail rates have been well maintained at 25 cents, but the total receipts of the Atlantic ports during the 109 days last year were 365,751 bushels per day, while during the 83 days this year they have been 501,685 bushels. Thus the canal movement was 28¼ per cent. of the total movement to the seaboard last year and 41¼ this year—a much larger proportion of the whole than in any recent year previously. Even in 1880, when the canal movement was 50 per cent. larger than this year, it was but 33¼ per cent. of the total movement to the seaboard, which in that year for the 100 days after the opening of the canal averaged more than a million bushels per day. Then, too, the average total New York receipts were 531,238 bushels per day, against an average canal movement of 310,675 bushels; last year the New York receipts were 206,751 bushels per day; the canal movement, 103,167; this year, with New York receipts 261,625 bushels, the canal movement has been 206,900 bushels per day. From the time of the opening of the canals down to July 28 the total receipts of grain at New York were 21,714,832 bushels, while the deliveries by canal at tide-water (very nearly all at New York) meanwhile were 17,172,653 bushels, or apparently 79 per cent. of the whole, leaving but 4,542,000 bushels to come by rail, which is not much more than a single railroad brought in a single month in 1881, at war rates.

A NEW TICKET SCALPER'S SWINDLE is described in a letter on another page from Mr. C. H. Kendrick, the Auditor of Passenger Receipts of the New York Central & Hudson River Railroad. The New York Central coupon of the "Stromberg ticket" has of course the ticket number on one edge, and on the face of the ticket the names of several stations, to any one of which it is made good by a punch which cuts on both sides of the station to which the ticket may be sold, and no ticket is good which has more than one destination so indicated. But the ticket swindler buys a ticket to a station near the Buffalo end of the road, and then tears off enough of that end of the ticket to remove the punch marks, and also the consecutive number. This mutilates the ticket, it is true, and it may be said that a ticket so mutilated ought not to be accepted by the conductor. But it is not very uncommon in removing coupons to tear off a corner, sometimes a pretty large corner, of the adjoining coupon, and in most cases this does not remove anything necessary to the identification of the ticket, and so is passed by the conductor, who is rightfully careful not to put to inconvenience a holder of a manifestly genuine ticket which may have been accidentally torn; and when the consecutive number is torn off it is usually impossible to prove that it was not accidentally torn. The ticket swindler knows this, and takes advantage of it.

It is probable that the success of this scheme has caused the swindlers engaged in it to sell tickets by other routes. Such tricks are inevitably detected within a moderate period, and whatever is made by them must be made quickly, so that the swindlers are apt to cover as large a territory as possible with their sales of falsified and mutilated tickets from the beginning. Railroad officers should, therefore, put their conductors on guard against this peculiar swindle at once.

THE TRAVELERS' OFFICIAL RAILWAY GUIDE, we said last week, when comparing it with a guide for 1849, had 480 pages. This is the space in the July issue devoted to time-tables. It is prefaced by 40 pages of tables, etc., essential to the guide, and the August issue has 572 pages, making a truly enormous volume—probably the largest monthly published in the world. In such type and with such pages as those of the monthly magazines—the *Century*, for instance—the August number of the *Official Guide* would make more than 1,500 pages.

A new feature is introduced with the August number. This is a railroad map of the United States, not folded like the map given heretofore in the January number, but in sections occupying one page each, with references on the margins to the pages which contain adjacent territory. A folded map on a scale large enough to be of any use is almost impossible to use without a large table to put it on, and very inconvenient under any circumstances. The new arrangement is substantially an atlas of the United States—not an elegant one, but sufficient for the purposes of a railroad guide.

It is hardly necessary to commend this work to railroad men, to many of whom it is an indispensable piece of office furniture. With the vast extent and rapid growth of our railroad system it requires the utmost care and vigilance to keep it complete and accurate. This it is to an extent very rare in any work of reference, and made possible in this case only because the editor's passion for accuracy is

seconded by the cooperation of the officers of the railroads throughout the country, who cannot afford to have their lines omitted or wrongly represented in the *Official Guide*.

**BUFFALO LAKE GRAIN RECEIPTS** have not increased this season in the same proportion as the canal shipments. Down to the end of July they have been 24,584,830 bushels this year, the season having been 96 days long, while last year, in a season 118 days long to the same date, lake shipments were 20,873,630 bushels. Thus the average daily receipts were 258,092 this year, against 176,895 last year while the average canal shipments increased from about 103,000 to 206,000 bushels daily. The gain in lake receipts was 45 per cent.; in canal shipments, 100 per cent. The amount of increase for the whole season was 3,711,200 bushels by lake and 6,300,290 by canal. The difference perhaps may be regarded as the measure of the effect of the abolition of tolls on canal shipments. The increase in the supply of grain to be moved and in the exports should have affected lake and canal carriers about alike.

Coal shipments from Buffalo by lake, notwithstanding the longer season, were but 8,000 tons more this year than last—544,200 tons against 536,200, which is 5,681 tons per day this year and 4,545 last.

### THE SCRAP HEAP.

#### Locomotive Building.

The Pittsburgh Locomotive & Car Works have orders to fill for the Pittsburgh & Western, the Pittsburgh, Cleveland & Toledo, the Maryland Central, the Pittsburgh, McKeesport & Youghiogheny and several other roads.

The Baldwin Locomotive Works in Philadelphia have recently taken a large order for locomotives from the Pennsylvania Railroad Co. These works expect to turn out 240 engines during the current half-year.

#### Car Notes.

The Michigan Car Co. in Detroit has just taken contracts to build 500 box cars for the Chicago, Milwaukee & St. Paul, and 250 coal cars for the Wheeling & Lake Erie road. The works are also building a number of Tiffany refrigerator cars.

The Pullman shops at Pullman, Ill., have closed a contract to build 1,000 box cars for the Cincinnati, New Orleans & Texas Pacific Co. The shops are very busy.

J. G. Brill & Co. in Philadelphia are just completing an order for 10 passenger cars for the New York & New England road.

The Pullman car shops have just delivered four new sleeping cars to the Chicago, Burlington & Quincy road, to run between Chicago and Council Bluffs.

The Gilbert Car Manufacturing Co. in Troy, N. Y., is building 10 new passenger cars for the New York & New England road.

The Haskell & Barker Car Works in Michigan City, Ind., have just completed 200 coal cars, to carry 20 tons each, for the Chicago & Eastern Illinois road.

The Huntington Car Works in Huntingdon, Pa., are building 500 drop-bottom coal cars for the New York & New England road.

#### Bridge Notes.

The Philadelphia Bridge Works of Cofrode & Saylor at Pottstown, Pa., have taken contracts to build seven bridges on the new Reading line of the Pennsylvania Railroad. These include bridges over the Schuylkill at Brooke's and Douglassville, each about 660 ft. long; a bridge over the Manatawney at Pottstown, 120 ft. long; four bridges over the canal at Monocacy, Frick's Lock, East Coventry and Spring City, each about 160 ft. long.

The Central Bridge Co. is putting up an iron viaduct, 450 ft. long, at Irondequoit, N. Y., for the New York, West Shore & Buffalo road.

#### Iron Notes.

The Scranton Steel Co. in Scranton, Pa., is running its new mill on several heavy orders for steel rails.

The Calumet Iron & Steel Co. at Calumet, near Chicago, has executed a mortgage on its property to secure \$300,000 bonds. One-half of this amount will be used to take up existing bonds, the balance to pay off the floating debt.

The Missouri Malleable Iron Co. in St. Louis has taken a large order from the American Brake Co. for malleable castings.

The rolling mill of Hooven & Son, at Norristown, Pa., has been enlarged, and started up again last week.

#### Manufacturing Notes.

The Pennsylvania Steel Co. at Steelton, Pa., is making interlocking and signal apparatus for the draw-bridge at Cos Cob, Conn., on the New York, New Haven & Hartford road.

J. A. Fay & Co. in Cincinnati, have a large contract for wood-working machinery for the Pullman Car Works at Pullman.

The Pennsylvania Bolt & Nut Co. has occupied its extensive new mill in Lebanon, Pa., and is at work.

Mr. A. L. Rowe now represents in New York the house of Charles W. Pickering & Co., of Philadelphia, manufacturers of car and locomotive springs.

#### The Rail Market.

**Steel Rails.**—The market is quiet but steady, and quotations continue unchanged at \$85 to \$89 per ton at mill for summer or fall delivery, and somewhat lower for orders that are not pressing.

**Rail Fastenings.**—Spikes are still quoted at \$2.60 per 100 lbs. in Pittsburgh. Track-bolts are quoted at \$3 to \$3.25 per 100 lbs., and splice bars 1.90 to 2 cents per pound.

**Old Rails.**—The market is quiet, with some inquiry for good lots. Quotations are \$22.50 to \$23 per ton in Philadelphia for American iron rails, and \$21.50 to \$22 for foreign.

#### A Peculiar Map.

A prospectus of the Shawneetown & Paducah Railroad has just been issued, containing the names of the directory, local in character, but including the name of General J. H. Wilson, President of the New York & New England Railroad. The scheme contemplates the construction of a road from Shawneetown, Illinois, to Paducah, Kentucky. With the prospectus is printed a map, not, however, to be relied upon for its accuracy, inasmuch as it shows a projected extension of the Danville, Olney & Ohio River Railroad from its present terminus at Olney to Shawneetown. Inasmuch as all the plans and locations of the last-named railroad show an extension by an entirely different route, via Fairfield, this Shawneetown & Paducah map must be taken as indicative of the visions of its promoters rather than of geographical and railroad fact.—*Boston Advertiser*.

That is a very small matter to any one familiar with pros-

pectus maps. The gentlemen who prepare those documents seem usually to have great confidence in the unbounded credulity of investors and their ignorance of local geography.

#### A Crazy Engineer.

The action of Engineer Norval Sala, who runs on the Chicago & Indianapolis Air Line, has raised the question, Is he insane? Day before yesterday he was ordered with his engine to haul the mixed train out of Indianapolis over the Air Line. Matters moved along smoothly until Holton, a station on the road, was reached. Here Sala deliberately uncoupled his engine from the train and without any notice started off at a high speed, ran to Monon, 37 miles, without a stop, and on reaching that point told the telegraph operator that his engine leaked and he was running wild to La Fayette. He then started down the main line with his engine for that point. Meantime at Holton was standing a freight train of 18 loaded cars and a passenger coach on which were some twenty or more passengers, and there the train stood until 4:30 p. m. As Holton was not a telegraph station, nor the next one north, the conductor was obliged to walk to the second station before he could transmit the news by wire of the antics of his engineer.—*Indianapolis Journal*.

#### Receipts and Expenses of the Chicago Exposition.

The following is published as an official statement of the receipts and expenditures of the Chicago Exposition of Railway Appliances:

Space fees.....	25,921.97
Entrance fees.....	5,115.00
Competition fees.....	6,490.00
Exhibitors' and employes' season tickets.....	6,779.00
Privileges (miscellaneous).....	2,990.80
Electric railway.....	2,649.00
General admissions.....	61,919.10
<b>Total.....</b>	<b>\$111,865.87</b>
<b>Expenditures:</b>	
Advertising.....	\$8,570.67
Printing and stationery.....	6,107.08
Furniture and fixtures.....	622.57
Pay rolls of superintendent.....	4,767.47
" secretary.....	4,298.04
" treasurer.....	2,525.80
" police.....	4,764.05
" firemen.....	700.03
Annex and maintenance.....	38,039.52
Addition and improvements to main building.....	17,751.10
Electric railway.....	13,659.98
Electric lighting.....	4,900.00
Foreign exhibit.....	3,475.26
Preparing for and maintenance of machinery.....	11,042.60
Unclassified and miscellaneous.....	14,101.24
<b>Total.....</b>	<b>\$135,326.01</b>

This leaves a deficit of..... \$23,460.00

To the above statement should be added the following items:

Unpaid bills July 27.....	\$7,000.00
Cost of medals.....	7,000.00
<b>Total.....</b>	<b>\$14,000.00</b>

There are still uncollected assets as follows:

Lumber to be sold.....	\$3,000.00
Railway tickets.....	3,000.00
Electric railway.....	7,500.00
<b>Total.....</b>	<b>\$13,500.00</b>

Adding these (estimated) assets, and deducting the above additional expenses (also estimated) makes the net deficit \$23,960 in all.

#### A Singular Accident.

On the evening of the 27th a passenger train on the Buffalo, New York & Philadelphia road, near Machias, N. Y., struck the limb of a large tree which had blown down close to the track. The jagged edges of the limb reached just high enough to strike the lower half of the windows, and before the train could be stopped the limb had banged out nearly every pane of glass in one side of two coaches, and also done some damage to the sash. There was much excitement in the car as the glass was cracking and hissing through the air. Two Italians received painful wounds in the arm, and one was taken home in a carriage, with his arm probably broken. Other people were cut in the face and hands, but none seriously injured.

#### The Antelope Dodge.

The Milwaukee Sun, after taking a trip to Denver over the Chicago, Burlington & Quincy road, proceeds to libel the company in the following base manner: "I suppose it is mean to give this railroad away, on the antelope question, but I must. They want passengers to see antelope, so they can talk about them when they go home, but the antelope, if there are any, keep away from the railroad, and if passengers strain their eyes for half a day and don't catch sight of one they are apt to comment on the fact unfavorably. This fact bothered the General Passenger Agent for a long time, and he finally decided to go into the antelope business, so he has an antelope ranch, 40 miles east of Denver, and every day an antelope or two is taken from the ranch to a place near the track by a trusty servant of the company, and just as the train is passing the antelope is let loose. It looks around for a moment, to get its bearings, the engineer, who is on to the scheme, blows his bazzoo, and the little antelope starts off for the ranch, and the passengers, who have been looking for antelope, yell, 'antelope,' and watch the dear little thing clear out of sight."

#### Splicing the Cables on the Brooklyn Bridge Railroad.

Any one who crosses the bridge may see, on either side of the footpath, a large iron rope lying in the centre of the railroad tracks, and resting on grooved wheels, which are mechanically known as sheaves. To-day this rope has no end. The work of making it endless was finished yesterday. It is all round, 11,000 ft. long, or about two miles. Its weight is 3.1 pounds per foot, which gives it 35,900 pounds for a total weight. The diameter is 1½ in. and it has a breaking strength of 50 net tons. Most people who look down from this footpath on the cable suppose it to be a solid coil of iron or steel wire. In this respect they are mistaken. The centre of it consists of a tarred hempen rope or cord; round the centre six strands of wire are coiled, and each strand consists of 19 wires, so that the cable consists of 114 wires, compactly and stoutly wound spirally about a hempen centre. Thus all traction cables of this size are made, in order to give them greater flexibility.

The most particular part of the work of rigging this traction cable was uniting the ends so as to make it endless. Any one who thinks about the matter closely will see the difficulty in the way. If it was a string, the ends could be tied; if it was a leathern belt, the ends could be secured by leathern thongings; but, it being a cable that must be of uniform thickness throughout, some degree of ingenuity and skill was required to put the ends together. The cable was furnished by

the Roebling wire factory, and when the work of laying it reached the point where splicing was necessary, application was made to the factory for a man skilled in splicing. The best man that could be had was asked for. The best man was at the time in California, whither he had gone to splice some cables for the Cable Street Railroad Company of that city. Engineer Martin was looking about for some other splicer when he learned that the man who had gone to California was on his way back. By waiting 48 hours, the man that was wanted was secured.

The splicing of such a cable, as has been remarked, is a pretty nice piece of business. It has been performed on the bridge cable so neatly that no one can discover where the two ends come together. Even an expert would have to go over the rope with almost microscopic care to find the place.

In order to keep watch of the spliced parts they have been painted white. The white place is 160 ft. long. As nearly as the process of splicing can be described here, it was done in this way: The ends of the cable were drawn 80 ft. each way from the point where they met—that is, they were lapped that distance. Then one of the six strands was uncoiled for the distance of 80 ft. Another strand was uncoiled for 68 ft., another for 56 ft., and so on for the whole six, each being 12 ft. shorter than the other. This process was observed on both ends of the cable. Then the strands thus "shingled" were intertwined so as to restore the size and shape of the original cable. In order to accomplish this, the hempen core of the original had to be taken out by winding it outward along the trend of the original twist. As each strand of one end was laid about its companions of the other end, its extremity was ingeniously pressed in toward the centre from which the hempen core had been removed, so that it is not seen, nor can it be found except by the closest tracing. To all appearance the cable was made endless at the factory. The engineers of the bridge have been very much interested in the work of making the splice, they having never before witnessed a like operation.—*N. Y. Evening Post, Aug. 8.*

#### Brake Successes.

A correspondent of the *London Engineer* writes to that paper as follows:

"Sir—I have read with much interest the details given upon page 477 of last volume, relating to the accidents avoided by the use of efficient continuous brakes, and can fully confirm your remark that similar incidents are frequently occurring without anything being heard of them. I therefore trust the Board of Trade will adopt the suggestion and publish a return of 'brake successes.'"

The three following cases will prove of interest: On the 28th May a collision took place on the Midland Railway at Leicester station between a Midland pilot engine, No. 63, and the rear of a London & North-western passenger train, in consequence of an error of judgment on the part of the driver. This man did not see the danger in time to prevent the accident, but the application of the Westinghouse brake at the last moment rendered what would have been a serious collision practically harmless, and avoided all telescoping of the carriages.

On the 26th June a heavy express train was running at full speed near Tilburg station, on the Dutch State Railway, when a steam tramway engine, through an error on the part of its driver, ran through the crossing gates and obstructed the main line. The driver of the express saw the danger, and by the instantaneous application of the Westinghouse brake he was able to stop just clear of the tramway engine, and thus avoided the accident.

Last week another instance took place upon the same railway at Hertogenbosch station, where up and down express trains were due to arrive at the same time; by some error the facing points at the end of the station had been left open, the result being that a collision between the two trains was imminent. Very fortunately both trains were fitted with the Westinghouse brake, and its instantaneous application brought both trains to rest with the leading buffers of the two engines only a few feet apart, thus preventing what would otherwise have been a fearful disaster.

#### Attempts at Train Wrecking.

A dispatch from Worcester, Mass., Aug. 2, says: "An attempt was made to wreck the first New York special express on the Boston & Albany Railroad, one mile east of Rochdale, this afternoon. The train was due at Worcester at 2:30, and was coming down grade at the rate of 40 miles an hour. As it approached a cut, the engineer discovered a large rock resting on the inside of one of the rails. The engine was running with steam shut off, and by promptly applying the air brakes the train was brought to a standstill as the forward wheels of the engine hit the stone. Frank Chevilean and Jose Mauram, Italian boys employed with a construction gang on the Providence, Webster & Springfield Railroad, have been arrested on suspicion of having placed the obstruction on the track."

A dispatch from Dallas, Tex., July 30, says: "A villainous attempt at train robbery on the Texas & Pacific Railroad was made and thwarted about 75 miles west of Dallas by setting fire to the immense bridges spanning the Bravos River and cañons in the Palo Pinto mountains. The engineer of the east-bound through express from El Paso, shortly after midnight, discovered the fire just in time to stop within a few yards of the structures. The stringers leading to the main abutments were almost burned through, and had the train gone on it would undoubtedly have been hurled to the bottom of the cañon, nearly one hundred feet below. The engine was detached, and ran over and across the western bridge to the tank some distance beyond, where it obtained water, and, running back, put out the fire with the hose. No sooner was this done than the eastern bridge, over which the engine had not passed, was also seen burning. This fire was soon extinguished, and after two hours' hard work both bridges were repaired, and the train passed over safely. Parties who intended to rob the train were deterred from making the attempt by the discovery that a detachment of United States troops, and eight or ten Texas rangers were on board, who showed themselves when the train stopped at the first bridge. Several mounted and armed men, were seen to emerge from a clump of bushes near by and ride rapidly away into the mountains."

#### An English Electric Railway.

The electric railway at Wimbledon, says the *London Times*, is in operation, and a train with Earl Brownlow, Sir Henry Halford, and 18 other members of the association ran the length of the line, about a mile, at a speed (six miles an hour) which earned for the engineer the congratulatory of the party. The experiment has been, unfortunately, a rough one, and the conditions under which it has been carried out are very detrimental to the reputation which the system is susceptible of attaining. The familiar track of light rails laid down 22 years ago, with carriages of the same date, the sleepers loose in the sandy soil, is not the kind of line for an electricity-driven train to be shown off upon, especially when the wheels of the cars are so much furrowed that their bearing surfaces bump on every chair of the rails they pass over. The system of propulsion is by current generated from a Weston dynamo, worked by a 12-horse-power Robey engine, and conveyed and returned by two flat copper bands about an inch broad, each laid at

the bottom of a groove in long wood bearers stretched midway between the lines of rails, and supported on square wood blocks saturated with pitch. The insulation appears to be perfect, for when tested by a galvanometer and a battery of five cells, not the slightest deflection of the needle takes place. The motor consists of four external magnets coupled together in similar poles, and an armature formed of 16 magnets, traveling in the interval between the external magnets and cutting all the lines of force. It is mounted on one of the ordinary carriages, and the current is drawn off from and returned to the conductors, by two trailing chains dropping within the conductor channels.

#### The Indian on the Railroad.

A few days since the writer was riding from Omaha to Sioux City over the Minneapolis & Omaha Railway. The road-bed had suffered some from rains and swollen streams, and scattered along the way were groups of men repairing the damage by filling in with earth. The swarthy features of many of those thus employed attracted the attention of the passengers, and some one asked if they were not Indians. He was told they were. "How comes it they are working here as section hands?" asked the writer of the train hand. "Why, they appear to be struck on the work," he replied. "They come and hang around the station-houses and insist on being hired whenever there is any extra work to be done, and every regular gang has both Winnebagoes and Omahas in it. They seem to think they are entitled to this employment." "Are they efficient workmen, or do they sometimes try to shirk?" "You better believe they work just as good as any of 'em. Talk about the Chinese section hands on the Un' Pacific; they are nowhere 'longside of them Indians. They'd soon get bounced if they didn't do a full day. As it is they make as much as any of 'em."—*Omaha Bee.*

#### Five Days in a Car.

Workmen employed at Washington avenue wharf yesterday observed a small stick protruding from a hole in a freight car standing on the tracks. The stick kept moving around and the men decided to open the car. The door was thrown open and there, to their great surprise, was a half-starved lad. The boy's countenance was haggard and he was too weak to walk. He was taken to the Second District police station, where Dr. Nebinger gave the boy some restoratives, and prescribed light but strengthening food.

The boy told the following story: "My name is Frank Harris. I live in Chicago, where both of my parents were buried some time ago. I am 13 years old. I had no one to take care of me, and I earned a few pennies whenever I could. On last Wednesday I saw the men loading the cars at the depot at Chicago. At dinner-time, when the men left, the car was only partly loaded. I crept in and hid in the corner behind a big box. I thought I would take a short ride, and when I got out into the country I would get off the car and find work. The men came back and filled the car and locked the door. That afternoon we started off, and I have been in the car ever since. We often stopped, and I halloed, but I could make no one hear me. Then we would rumble off again, and I would throw myself back and cry. I don't know how long I was in there or how far we went."—*Philadelphia Record, Aug. 4.*

#### A Narrow Escape.

Passengers who were on Erie train No. 4 last Thursday night are probably not aware how near they came to a terrible disaster. As is pretty generally known, all way trains are obliged to take side tracks in time to leave the main road clear for the "flyer." On the night referred to, trains 38 and 49 were ordered to take the switch near Friendship, to let the express pass. Train 38, coming east, arrived first and entered the switch from the west end. Train 49 arrived soon after and started in on the same switch from the east end. Before the train had been drawn in far enough to clear the main track, the engineer, seeing the headlight of train 38 ahead, and not knowing whether it was standing still or pulling toward him, reversed his engine and stopped. For some reason unknown to our reporter, no flag was sent out by the latter train to stop No. 4, which soon came thundering along at terrific speed. The engineer of train 38 heard the "flyer" approach, and becoming suddenly seized with fear, turned to a brakeman who happened to be in the engine and exclaimed, "For God's sake flag that train!" although he was not certain at the time that the train at the east end had not cleared the track. The brakeman leaped to the ground and ran to the front of the locomotive, where he seized one of the signal lamps, which at first he could not get loose, but by bringing all his strength to bear upon it, succeeded in pulling it from its fastening. He ran to the side of the track and in attempting to swing the lamp the light went out, and the "flyer" dashed by like a gust of wind. The ever-watchful engineer, Mr. J. K. Chapman, had observed the movement of the lamp, and, fearing danger, immediately applied the air-brakes, reversed his engine, and worked her hard in the back gear. He stopped so quick that the passengers were lifted clean from their seats. It was the quickest stop ever made on the division, but it was no better than the occasion required. After the stop had been made it was found that the "flyer" lacked only a couple of lengths of crashing into the side of train 49.

When train 4 passed the Friendship depot it was running at the rate of nearly a mile a minute, being a little late, and there is no telling what the consequences would have been only for the sudden action taken by engineer Boyden, of train 38. It is said that as the "flyer" dashed by his engine he became so paralyzed that he could not move for some time. —*Hornellsville (N. Y.) Times, Aug. 1.*

#### Another Fireman Saves a Child.

John DeGerid, the fireman of engine No. 179, did a gallant deed Wednesday morning on the run up to the Junction. On reaching the curve this side of North Aurora a little child was noticed on the track only a short distance ahead. Brakes were called for, and at the sound of the whistle the little child started to run, but fell prostrate, and instantly realizing that the train could not be stopped in time, John hastened over to the front of the engine, and climbing down upon the pilot he clung to the shackle-bar with one hand, while with the other he was fortunate enough to seize the child, snatch it from the track and hold it out of danger until the train came to a stop. The occurrence was witnessed by both parents of the child and several other persons, none of whom, however, were near enough to attempt a rescue, and even John's prompt action barely saved the little one from a horrible death, as there was not an instant to spare. —*Aurora, Ill., Beacon, Aug. 1.*

#### Car Thieves Arrested.

A dispatch from St. Louis, Aug. 5, says: "Dick Lindsay, his son Thomas Lindsay, Ellis Rhodes, Mace Jones and Wm. West, members of a gang of railroad thieves, were arrested at Brooklyn, Ill., opposite this city, between 1 and 3 o'clock this morning by Detective Furlong and six of his men belonging to the secret service of the Missouri Pacific Railroad. These men are all negroes and belong to the same gang, several members of which were arrested some weeks ago and are now in jail at Belleville, Ill. Fourteen of the gang have so far been arrested, and the prospect is that

all of the remainder, seven in number, will be captured in a few days, when the most effective band of railroad thieves ever organized will be thoroughly broken up. Mace Jones is the man who killed Town Marshal Green in Brooklyn last Tuesday night, and Lindsay and Rhodes shot—very seriously wounding—a car watchman named McLean three weeks ago."

## General Railroad News

### MEETINGS AND ANNOUNCEMENTS.

#### Meetings.

Meetings will be held as follows:  
*Richmond & Danville*, special general meeting, at the office in Richmond, Va., Sept. 12, at noon.  
*St. Johnsbury & Lake Champlain*, annual meeting, at the office in St. Johnsbury, Vt., Aug. 15.

#### Dividends.

Dividends have been declared as follows:  
*Cleveland & Pittsburgh* (leased to Pennsylvania Company), 1½ per cent., quarterly, payable Sept. 1. Transfer books close Aug. 10.  
*Detroit, Lansing & Northern*, 3½ per cent., semi-annual, on the preferred stock, and 3 per cent. upon the common stock, payable Aug. 15, to stockholders of record Aug. 6.

#### Railroad and Technical Conventions.

The *International Association of Traveling Passenger Agents* will hold its annual convention in Detroit, Mich., Aug. 15.  
The *Road-Masters' Association of America* will hold its first regular meeting in St. Paul, Minn., Sept. 12.  
The *Master Car-Painters' Association* will hold its annual convention in Baltimore, Sept. 19.  
The *New England Road-Masters' Association* will hold its first annual meeting in Boston, Sept. 20.  
The *American Street Railway Association* will hold its next meeting in Chicago, Oct. 9.  
The *American Institute of Mining Engineers* will hold its autumn meeting in Troy, N. Y., during the second week in October.  
The *General Time Convention* will hold its fall meeting at the Grand Pacific Hotel in Chicago, Oct. 11.  
The *Southern Time Convention* will hold its fall meeting at No. 46 Bond street, New York, Oct. 17.  
The *American Association of Railroad Superintendents* will hold its fall meeting in Washington, Oct. 23.

### ELECTIONS AND APPOINTMENTS.

*Belleville & Centralia*.—The directors of this company met in Belleville, Ill., last week, and elected D. P. Alexander, President; Russell Hinckley, Vice-President; Henry Davis, Secretary; H. A. Alexander, Treasurer; M. W. Weir, General Solicitor; D. P. Alexander, H. A. Alexander and Henry Davis, Executive Committee.

*Central, of Georgia*.—Mr. W. F. Shellman has been appointed Traffic Manager of this road and all its leased and controlled lines. He has been on the road a number of years, and has been Superintendent of the Southwestern Railroad Division since Mr. Raoul was chosen Vice-President some three years ago.

Mr. Theodore D. Kline has been appointed Superintendent of the Southwestern Railroad, to succeed Mr. Shellman. Mr. Kline is now Superintendent of the Atlanta Division of the East Tennessee, Virginia & Georgia, and was formerly on the Richmond & Petersburg road.

*Central Pacific*.—Mr. C. B. Seymour has been appointed Superintendent of the Colorado Division, with office at the Needles, Cal. This is the new division, built to connect with the Atlantic & Pacific.

*Chesapeake, Ohio & Southwestern*.—Mr. B. F. Mitchell has been appointed General Freight and Passenger Agent, with office in Louisville, Ky., in place of B. F. Blue, resigned.

*Chicago, Iowa & Kansas*.—The directors of this new company are: George T. Bowers, W. W. Guthrie, Thomas J. White, Atchison, Kan.; N. J. Ladd, Henry Parkham, E. E. Pratt, A. G. Stanwood, N. H. Stone, Boston.

*Chicago & Northwestern*.—Mr. Henry C. Wicker, Freight Traffic Manager of this road, has issued the following notice: "Mr. Peter Hallenbeck is appointed Assistant General Freight Agent of the Winona & St. Peter Railroad, also of the Dakota Division except the line between Iroquois, D. T., and Hawarden, Ia. All communications respecting the freight traffic of the above line should, after Aug. 1, be addressed to Mr. Hallenbeck at Winona."

Mr. Wm. S. Mellen, General Freight Agent of the same road, has addressed the following circular to all agents and connecting lines: "On and after Aug. 1, John S. George, Commercial Agent, office No. 102 Wisconsin street, Milwaukee, Wis., will have charge of rates and divisions from Milwaukee to Eastern and Southern points, all rail, via Chicago, Grand Haven, or Ludington; also via steamboat lines around the lakes. Agents and connecting lines interested will address him as above for rates and divisions on freights from Milwaukee to Eastern and Southern points."

*Cincinnati, Atlantic & Columbus*.—Mr. F. J. Roubesh, of Batavia, O., has been appointed Receiver of this unfinished road.

*Cleveland & Mahoning Valley*.—This company last week elected Stevenson Burke President; J. H. Devereux, Vice-President; E. E. Poppleton, Secretary; E. B. Perkins, Treasurer. The road is leased to the New York, Pennsylvania & Ohio.

*Lehigh & Wilkesbarre Coal Co.*—Mr. S. B. Whiting has been appointed Superintendent of this company's property. Mr. Whiting has been Chief Engineer of the Philadelphia & Reading Coal & Iron Co. for some time.

*Miramichi Valley*.—At a meeting of the corporators of this new company at Fredericton, N. B., Aug. 2, the following directors were chosen: Alexander Gibson, John Gibson, Alexander Morrison, Wm. Muirhead, John Pickard, Alfred Rowley, J. B. Snowball.

Another party of the corporators met at Newcastle, N. B., on the same day, and elected the following directors: R. R. Call, Allan A. Davidson, John C. Miller, Wm. Richards, Robert Swin, R. P. Whitney, James Wilson. This board elected R. R. Call President; W. A. Park, Secretary and Treasurer.

The courts will have to decide which is the legal board.

*Mt. Vernon & Tamaroa*.—Mr. E. W. Muenschler is Chief Engineer of this new Illinois road.

*New Brunswick*.—At the annual meeting in Fredericton, N. B., Aug. 2, the following directors were chosen: Isaac Burpee, St. John, N. B.; George Stephen, Montreal; E. R. Burpee, Bangor, Me.; D. Willis James, J. S. Kennedy, J. Kennedy Tod, O. H. Northcote, Samuel Thorne, New York; Lord Elphinstone, Scotland. The board elected Samuel

Thorne President; I. Burpee, General Manager; Alfred Seeley, Secretary and Treasurer.

*Northern Pacific*.—Mr. H. Haupt, General Manager, has issued the following circular, dated Aug. 1, 1883:

"The following changes are hereby made in the organization of the operating departments of the Northern Pacific Railroad, the same to take effect at this date:

"J. T. Odell is appointed Assistant General Manager of the Eastern Division, to include all branches and leased lines east of Helena, Montana.

"The charge of J. M. Beckley, Assistant General Manager of Western Division, is extended to Helena, and includes all branches and leased lines west of that point. Office at New Tacoma, Washington Territory.

"John Muir is appointed Superintendent of Traffic for the whole line. Office at St. Paul, Minn.

"The assistant general managers are authorized to approve all requisitions, pay-rolls and vouchers on the divisions under their charge, and perform the ordinary official duties of the General Manager.

"They will, unless otherwise ordered, supervise and direct the operations of the transportation and road departments, and receive reports from all officers connected therewith.

"The machinery department for the whole line will continue as heretofore under the charge of G. W. Cushing, Superintendent of Motive Power, Machinery and Rolling Stock, who will report to the General Manager.

"The operating divisions east of Helena will be consolidated into three grand divisions, as follows:

"The First Grand Division will embrace the Minnesota Division and branches, including the St. Paul & Northern Pacific; the Northern Pacific, Fergus & Black Hills; the Little Falls & Dakota; the Wisconsin Division; and such other branches, extensions and leased lines as may be connected therewith.

"The Second Grand Division will include the Dakota and Missouri divisions, the Fargo & Southwestern, the Jamestown & Northern, and extensions to be constructed hereafter.

"The Third Grand Division will include the Yellowstone and Montana divisions, the National Park Branch, and other branches to be constructed.

"M. C. Kimberly will be Superintendent of the First Grand Division. Office, Brainerd, Minn.; A. E. Law and W. D. Simpson, Assistants, with offices at St. Paul and Fergus Falls, Minn., respectively.

"J. M. Graham, Superintendent of Second Grand Division. Office, Fargo, Dak. A. L. McLeod, Assistant, in charge of Missouri Division, vice D. R. Taylor, resigned. Office, Mandan, Dak.

"S. R. Ainslie, Superintendent of Third Grand Division. Office, Glendive, Montana. F. L. Richmond, Assistant, in charge of Montana Division. Office, Livingston, Montana.

"This consolidation of divisions will affect only the general supervision. All accounts, pay-rolls, vouchers, etc., must be kept separate and distinct for each division, as heretofore, and especial attention must be given to the distribution of accounts, in order that the operating expenses of each division may be separately and accurately determined, in accordance with the instructions heretofore given.

"Uniformity in rules, regulations, signals, forms and accounts must be insisted on, and no division superintendent or other officer will be permitted to vary from established standards in construction or operation without the approval in writing of the General Manager."

*Pennsylvania*.—Mr. Robert L. Holliday has been appointed Superintendent of the Bedford Division in place of Thomas A. Roberts, transferred. Mr. M. W. Thompson succeeds Mr. Holliday as Engineer of Maintenance of Way, Pennsylvania Railroad Division.

Mr. Thomas A. Roberts, late of the Bedford Division, is appointed Superintendent of the Middle Division of the Philadelphia & Erie Division.

*Rutland*.—The new board has elected Charles Clement President in place of John B. Page, and J. H. Wilson Treasurer, *pro tem.*; subsequently the board elected J. A. Mead Treasurer, and George R. Bottom, Register.

*St. Joseph, Joplin & Gulf*.—The officers of this new company are: President, Abram Nave, St. Joseph, Mo.; Vice-President, C. Leland, Jr., Troy, Kan.; Secretary, J. W. Porch, St. Joseph, Mo.; Superintendent, Joseph Harrison.

*St. Louis, Alton & Terre Haute*.—Mr. Frank C. Hollins, of New York, has been chosen a director in place of Charles G. Landon.

*St. Louis, Emporia & Denver*.—The directors of this new company are: R. W. Blue, H. C. Cross, C. Hood, Wm. Martindale, Emporia, Kan.; J. L. Price, Butler, Mo.; John D. Perry, John Scullin, St. Louis, Mo.; Charles Foster, Fortoria, O.; Amos Townsend, Cleveland, O.; Warner Miller, Herkimer, N. Y.; Thomas M. Nichol, New York.

*Texas & St. Louis*.—Mr. W. M. Freeman has been appointed General Agent of this road for the state of Texas.

*Toledo, Cincinnati & St. Louis*.—The United States Circuit Court has appointed Mr. E. E. Dwight Receiver of this road. Mr. Dwight has been General Manager of the road for several months, and had previously served as Division Superintendent on the New York, Chicago & St. Louis and the Cincinnati, Hamilton & Dayton roads.

*Vandalia & Springfield*.—Mr. E. W. Muenschler is Chief Engineer of this new Illinois road.

### PERSONAL.

—Mr. B. F. Blue has resigned his position as General Freight and Passenger Agent of the Chesapeake, Ohio & Southwestern road.

—Mr. D. R. Taylor has resigned his position as Superintendent of the Missouri Division of the Northern Pacific road, and will go into other business. He will remain in Dakota.

—Mr. James Cooke, for 14 years Superintendent and for a year past President of the Cooke (formerly the Danforth) Locomotive & Machine Works, of Paterson, N. J., died Aug. 2, aged 46 years. A more extended notice of his life will be found elsewhere.

—Col. George L. Perkins, Treasurer of the Norwich & Worcester Railroad Co., is without doubt the oldest railroad officer in the United States. He celebrated his ninety-sixth birthday at his residence in Norwich, Conn., Aug. 4. Col. Perkins is still an active man and attends regularly to business.

—L. F. Booth, Joint Immigrant Agent of the trunk lines at Castle Garden, has been missing from his office and home since Friday, July 27, and his accounts were found in confusion. Little money passed through his office except the collections for excess baggage, which were usually settled monthly, and these were not great in amount, and certainly not enough to tempt a man of Mr. Booth's position to give up for it the salary he could command, even if position and principle had nothing to do with it. But there is so far no explanation of his disappearance and apparent defalcation.

## TRAFFIC AND EARNINGS.

## Railroad Earnings.

Earnings for various periods are reported as follows:

Seven months ending July 31:	1883.	1882.	Inc. or Dec.	P. c.
Canadian Pacific.....	\$2,761,112	\$1,172,250	I. \$1,588,862	134.8
Central Iowa.....	678,797	697,778	I. 18,981	2.8
Chi. & Alton.....	4,597,564	4,139,749	I. 457,815	11.1
Chi. & Eastern Illinois.....	913,425	964,130	D. 50,705	-5.3
Chi. & Grand Trunk.....	1,591,515	1,143,908	I. 447,607	39.0
Chi. Mil. & St. Paul.....	12,519,440	10,621,175	I. 1,898,265	18.1
Chi. & Northwestern.....	1,975,335	1,975,140	I. 195	0.0
Chi. St. P. Minn. & Oma.....	2,761,827	2,761,827	I. 0	0.0
Cin., N. O. & Tex. Pacifc.....	1,378,472	1,365,515	D. 12,957	-1.3
Denver & Rio Grande.....	319,609	3,601,100	I. 3,281,491	1029
East Tenn. Va. & Ga.....	2,096,672	1,948,232	I. 148,440	7.6
Hannibal & St. Joseph.....	1,347,127	1,131,830	I. 215,297	19.0
Ind. Bloom. & Western.....	1,635,129	1,335,785	I. 299,344	22.4
Little R. & Ft. Smith.....	177,484	231,357	I. 53,873	30.3
Little R. Miss. R. & Tex.....	244,301	1,375	I. 242,926	10000
Long Island.....	1,446,904	1,330,663	I. 116,241	8.7
Louisville & Nashville.....	7,483,777	5,671,893	I. 1,811,884	32.0
Memphis & Charleston.....	662,437	5,671,893	I. 1,811,884	32.0
Mt. Lake Shore & W.....	447,159	476,536	I. 29,377	6.4
Mo. Pacific lines:				
Central Branch.....	706,948	440,273	I. 266,675	60.6
Int. & Gt. No.....	2,626,140	1,714,164	I. 911,976	53.2
Mo., Kan. & Tex.....	3,480,400	3,153,000	I. 327,400	10.4
Mo. Pacific.....	3,480,400	3,153,000	I. 327,400	10.4
St. L. Iron Mt. & So.....	4,434,297	3,707,820	I. 726,477	19.6
Texas & Pacific.....	3,374,297	3,512,509	I. 138,212	4.0
Mobile & Ohio.....	1,102,315	1,102,315	I. 0	0.0
N. Y. & N. England.....	6,627,806	1,839,325	I. 4,788,481	258.0
Northern Pacific.....	4,316,158	3,333,384	I. 982,774	29.5
Ohio Central.....	571,518	571,518	I. 0	0.0
Ohio Southern.....	224,480	224,480	I. 0	0.0
Oregon Ry. & Nav. Co.....	2,734,490	2,734,490	I. 0	0.0
Peoria, Decatur & Ev.....	377,875	424,993	D. 47,118	-11.3
St. L. & San Francisco.....	1,446,910	1,282,386	I. 164,524	12.8
St. P. & Duluth.....	663,156	517,303	I. 145,853	28.2
St. P., Minn. & Man.....	4,482,318	4,482,318	I. 0	0.0
Union Pacific.....	15,422,828	15,774,774	D. 351,946	-2.2
Six months ending June 30:				
Atchafalaya, Topeka & S. F.....	\$6,674,042	\$6,837,349	D. 163,307	-2.4
Net earnings.....	3,333,749	2,377,775	I. 955,974	40.2
Chi. Bur. & Quincy.....	11,485,233	9,153,616	I. 2,331,617	25.5
Net earnings.....	5,815,547	3,891,513	I. 1,924,034	49.4
Cin. Wash. & Baltimore.....	566,581	710,194	I. 143,613	25.3
Cleve., Col. Cin. & Ind.....	1,871,462	1,871,190	I. 272	0.0
Kan. City, L. & So. Kan.....	694,932	694,932	I. 0	0.0
Net earnings.....	344,802	2,790	I. 342,012	12400
Month of June:				
Atchafalaya, Topeka & S. F.....	\$1,146,107	\$1,152,479	D. 6,372	-0.5
Net earnings.....	655,585	451,306	I. 204,279	45.3
Chi. Bur. & Quincy.....	1,971,916	1,471,164	I. 500,752	34.0
Net earnings.....	944,038	516,121	I. 427,917	82.9
Cin. Wash. & Baltimore.....	112,249	127,949	I. 15,700	12.3
Cleve., Col. Cin. & Ind.....	313,176	371,007	I. 57,831	18.5
Kan. City, L. & So. Kan.....	114,978	97,706	I. 17,272	17.6
Rome, Watertown & Og.....	143,126	135,928	I. 7,198	5.3
Net earnings.....	41,855	24,989	I. 16,866	67.4
Month of July:				
Canadian Pacific.....	\$531,000	\$281,000	I. 250,000	89.0
Central Iowa.....	100,972	91,287	I. 9,685	10.6
Chicago & Alton.....	715,593	702,614	I. 12,979	1.8
Chi. & Eastern Illinois.....	126,354	131,732	D. 5,378	-4.1
Chi. Mil. & St. Paul.....	1,849,090	1,464,916	I. 384,174	26.2
Chi. & Northwestern.....	2,570,900	2,570,900	I. 0	0.0
Chi. St. P. Minn. & O.....	433,830	586,400	I. 152,570	35.2
Cin., N. O. & Tex. Pacifc.....	232,982	216,441	I. 16,541	7.6
Denver & Rio Grande.....	647,000	4,400,000	I. 3,753,000	580.0
East Tenn. Va. & Ga.....	298,134	298,134	I. 0	0.0
Hannibal & St. Joseph.....	180,245	180,245	I. 0	0.0
Ind. Bloom. & Western.....	212,018	205,672	I. 6,346	3.1
Lake Erie & Western.....	77,012	105,863	I. 28,851	37.3
Little R. & Ft. Smith.....	39,661	37,558	I. 2,103	5.6
Little R. Miss. R. & Tex.....	24,943	17,735	I. 7,208	40.7
Long Island.....	766,914	3,941,121	I. 3,174,207	414.0
Louisville & Nashville.....	1,139,500	1,037,765	I. 101,735	9.8
Memphis & Charleston.....	8,015	6,331	I. 1,684	26.6
Mt. Lake Shore & W.....	81,826	68,983	I. 12,843	18.7
Mo. Pacific lines:				
Central Branch.....	69,832	57,602	I. 12,230	21.2
Int. & Gt. No.....	208,53	223,246	I. 14,716	7.1
Mo., Kan. & Tex.....	590,648	487,334	I. 103,314	21.2
Mo. Pacific.....	704,435	705,008	D. 573	-0.1
St. L. Iron Mt. & So.....	585,890	539,519	I. 46,371	8.6
Texas & Pacific.....	593,713	573,321	I. 20,392	3.6
Wabash, St. L. & P.....	1,138,849	1,138,849	I. 0	0.0
Mobile & Ohio.....	136,836	135,173	I. 1,663	1.2
N. Y. & N. England.....	304,288	298,441	I. 5,847	2.0
Northern Pacific.....	841,100	691,667	I. 149,433	21.5
Ohio Central.....	84,740	84,740	I. 0	0.0
Ohio Southern.....	29,255	27,491	I. 1,764	6.4
Oregon Ry. & Nav. Co.....	461,350	432,271	I. 29,079	6.3
Net earnings.....	231,244	231,244	I. 0	0.0
Peoria, Decatur & Ev.....	43,810	43,810	I. 0	0.0
St. L. & San Francisco.....	279,909	318,400	I. 38,491	13.7
St. P. & Duluth.....	177,979	166,690	I. 11,289	6.8
St. P., Minn. & Man.....	2,308,000	2,308,000	I. 0	0.0
Union Pacific.....	2,308,000	2,308,000	I. 0	0.0

It should be remembered that the earlier statements of earnings are largely estimated, and are subject to correction by later reports.

## Colorado Pool.

Commissioner George H. Daniels, of the Colorado Pool Association, has issued the following notice:

"To parties using the Missouri River joint rate sheet, west-bound, notice is hereby given: First, That first-class limited rates from Atchison and Leavenworth, via the Missouri Pacific Pacific Railway to local points on the Atchison, Topeka & Santa Fe and Atlantic & Pacific railroads, are void. Second, rates of all classes from Atchison and Leavenworth, via the Missouri Pacific Railway to Southern Pacific points, do not apply via Kansas City and the Atchison, Topeka & Santa Fe Railroad, Atchison and Leavenworth being local points to the Atchison, Topeka & Santa Fe Railroad."

## Passes over the Northern Pacific.

The Vice-President and the General Manager of the Northern Pacific Railroad have already found it necessary to issue circulars in relation to passes over that line. Vice-President Oakes' circular is as follows:

"The extension of the Northern Pacific Railroad is to Montana, and the early completion of its lines to the Yellowstone Park and to the Pacific will, no doubt, very greatly increase the applications for special privileges by religious, charitable, medical, legal, scientific and other associations, and by numerous other classes.

"The General Manager is therefore instructed to grant no special trains and no special cars gratuitously without authority in each individual case from this office, and so observe the rule of declining all applications for free passes, unless he shall in his judgment decide that the interest of the company in any particular case requires the issue, when he will report the fact and his reasons therefor to this office, as required by existing rules.

"The general rules heretofore adopted in reference to passes and reduced-rate tickets issued to clergymen, press representatives and others are sufficiently liberal, and must be rigidly enforced."

## General Manager Haupt's circular reads as follows:

"Passes and reduced rates to army officers, members of the press, missionaries and clergymen will be given under prescribed rules by G. K. Barnes, General Ticket Agent, St. Paul, to whom application should be made directly, and not through the General Manager.

## No passes will be given to influence business.

"None to parties who visit the country with a view to settlement.

"None to parties who propose to start new industries or solicit business for established houses.

"None to parties who wish to see the country and write notices.

## None to seekers of grazing ranges.

"None to employes of other roads who wish to see the country, except when special request is made by General Manager.

"None to employes of Northern Pacific beyond the division to which they belong, except when traveling upon company business under proper authority.

"None to families of employes except by recommendation of division superintendents or heads of departments, and in no case will application be made for passes over other roads for employes.

"Passes to state and territorial officials must be confined to the states and territories in which they are located.

"After Jan. 1, 1884, no passes or reduced rates will be given east of the Missouri River to parties who propose to erect elevators, mills or other buildings. The time has arrived when the protection of passes and reduced rates to encourage new industries must be withdrawn on the older divisions, and a revenue secured, if possible, to pay interest and expense of operation.

"A round-trip pass, on the completion of the road, will have a cash value of \$200, and an annual may be worth \$2,000. This is too much transportation to be given gratuitously. The Northern Pacific Railroad Co. propose to pay for all services received, and will expect proper consideration for all services performed."

## Grain Movement.

For the week ending July 28 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past seven years:

Northwestern receipts.		Northwestern shipments.		Atlantic receipts.	
Year.		Total.	By rail.	by rail.	by water.
1877.....	3,501,329	2,987,721	340,616	11.4	2,474,736
1878.....	3,532,269	4,327,804	1,333,150	30.8	3,044,654
1879.....	6,702,732	4,790,103	1,670,595	34.8	7,816,854
1880.....	9,393,826	6,074,774	1,773,891	29.2	8,458,545
1881.....	6,722,873	5,095,208	1,212,597	23.6	6,537,223
1882.....	6,917,729	4,740,417	1,768,028	37.3	5,473,525
1883.....	4,185,257	2,929,946	1,184,177	40.4	3,380,869

Thus the receipts of the Northwestern markets for the week were 2,732,000 bushels less than in the corresponding week of last year (which, with one exception, were the largest of the year), 5,208,000 less than in 1880, and the smallest since 1877. There were, however, 359,000 bushels more than in the previous month of this year, and the largest for five weeks. The effect of this year's harvest begins to be felt slightly, chiefly by larger wheat receipts at St. Louis; but the total wheat receipts are extremely small for the season. Northwestern receipts of wheat alone for the week to July 28 for four successive years have been:

	1880.	1881.	1882.	1883.
Bushels.....	3,456,718	1,711,101	3,986,077	938,932

Thus the wheat receipts this year, though larger than in previous weeks, were not one-fourth as great as last year. The shipments of these markets for the week this year were 1,810,000 bushels less than last year, not half as great as in 1880, and less than in 1877 even. They were also 353,000 bushels less than in the previous week of this year, and the smallest since navigation opened. The rail shipments, however, were the largest for six weeks, and the river shipments were 235,806 bushels, or 8 per cent. of the whole, which is the largest quantity for seven weeks. Thus the lake shipments were but 1,509,963 bushels, while early in the season more than 5,000,000 bushels went by lake in a single week, and but once before this season have they been less than 2,000,000 bushels.

The Atlantic receipts for the week were 1,153,000 bushels less than in the corresponding week of last year, 4,565,000 less than in 1880, and smaller than in any corresponding week since 1877. They were, however, 384,000 bushels more than in the previous week of this year, and the largest for four years. Atlantic receipts have usually begun to increase handsomely by this week after a good winter wheat crop—much more than this year. But there are distinct signs of the winter wheat harvest this year also, especially in the large wheat receipts of Baltimore, which are 622,871 bushels, and more than half of the whole Atlantic wheat receipts.

At this time last year wheat made 57 1/2 per cent. of the whole Northwestern grain receipts, and 83 per cent. of the Atlantic grain receipts; this year it forms but 22 1/2 per cent. of the Northwestern receipts, and 34 per cent. of the Atlantic receipts.

Exports from Atlantic ports for this week to July 28 have been for four successive years:

	1880.	1881.	1882.	1883.
Flour, bbls.....	165,219	113,678	96,247	109,518
Grain, bu.....	6,694,102	4,636,681	3,006,951	2,098,795
Total, bu.....	7,437,587	5,148,232	3,440,062	2,591,626

At this time last year exports had revived and large quantities of wheat were going forward. We see then in the aggregate the exports this year were 848,000 bushels less than last, and were 2,557,000 less than in 1881, and 4,846,000 bushels less than in 1880.

## Coal.

Anthracite coal tonnages reported for the seven months ending July 28 are as follows, the tonnage in each case being only that originating on the line to which it is credited:

	1883.	1882.	Inc. or Dec.	P. c.
Phila. & Reading.....	3,782,221	3,600,207	I. 182,014	5.1
North Central, Shamokin Div.....	371,974	368,701	I. 3,273	0.9
Summit Branch.....	270,851	262,907	I. 7,944	3.0
Sunbury, Hazleton & W.....	92,198	79,843	I. 12,355	15.5
North & West Branch.....	292,176	292,176	I. 0	0.0
Central of N. J.....	2,485,947	2,241,946	I. 244,001	10.9
Lehigh Valley.....	3,402,235	3,304,025	I. 98,210	2.9
Penna. & N. Y.....	111,730	111,011	I. 719	0.6
Del., Lacka. & Western.....	2,576,929	2,433,310	I. 143,619	5.9
Del. & Hudson Canal Co.....	2,044,783	1,854,238	I. 190,545	10.3
Pennsylvania Coal Co.....	735,228	720,000	I. 15,228	2.1
State Line & Sullivan.....	34,285	31,982	I. 2,303	7.2
Total anthracite.....	18,490,597	15,218,926	I. 3,271,671	21.5

The North & West Branch road was not opened at this time last year.

The tonnage of anthracite coal reported for the corresponding period for eight years has been as follows:

	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
1873.....	16,490,597	18,729,000	13,698,002	14,494,437	14,318,439	11,509,280	11,509,280	11,509,280
1874.....	15,218,926	18,729,000	13,698,002	14,494,437	14,318,439	11,509,280	11,509,280	11,509,280
1875.....	13,698,002	14,494,437	14,318,439	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280
1876.....	14,494,437	14,318,439	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280
1877.....	14,318,439	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280
1878.....	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280
1879.....	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280
1880.....	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280	11,509,280

The tonnage this year keeps very well up to its lead over the heaviest of former years, and it seems to be pretty well absorbed, notwithstanding some complaints of

order to get out of the way of any frosts that may come in September.

The wheat crop in Iowa is doubtless one of the best raised in that state for many years. Wheat has not done well in Iowa for a number of years, and its cultivation has been abandoned to a great extent, so that the average is much less now than several years ago. The production last year was 25,500,000 bushels, and the average yield 10½ bushels per acre, and that is more than the average yield for at least four years past. The area of some is nearly one fourth less this year than in 1880. But there has been years when the state produced more than 40 million bushels. Twelve bushels per acre will make a little less than 30 millions this year. The land formerly devoted to wheat is now used for more profitable crops.

#### Lake Superior Iron Ore.

Shipments of iron ore from the Lake Superior region from the opening of navigation up to Aug. 1 are reported as follows by the *Marquette Mining Journal*, in tons:

	1883.	1882.	Inc. or Dec.	P. c.
From L'Anse.....	29,081	25,017	L. 4,064	12.2
From Marquette.....	269,391	522,719	D. 253,328	48.4
From Escanaba.....	667,328	911,470	D. 244,142	26.8
From St. Ignace.....	8,290	15,025	D. 7,736	47.0
Total.....	974,089	1,475,731	D. 501,632	33.9

Besides the ore shipped from the Marquette District, 5,713 tons of ore are reported delivered to local furnaces.

Of the ore shipped from Escanaba 183,635 tons were from the Marquette District and 483,693 tons from the Menominee District.

The decrease in shipments thus far is a little over one-third, and this difference may be increased before the end of the season.

Shipments of pig iron this year were 1,224 tons from Marquette and 75 tons from St. Ignace, a total of 1,299 tons.

#### Pacific Through Freights.

Shipments of through freight eastward from California points for June and the six months ending June 30 were as follows, in tons:

	Central Pacific.	Southern Pacific.	Total.
June.....	8,574	4,497	13,471
Half-year.....	28,018	24,954	52,972

In June the Central Pacific carried 63.5 per cent. of the total. For the half-year the tonnage was more evenly divided, the Central Pacific carrying 52.9 per cent. and the Southern Pacific 47.1 per cent. of the total.

#### OLD AND NEW ROADS.

**Anniston & Atlantic.**—The contract for grading this road from Anniston, Ala., to Goodwater, about 50 miles, has been let to J. W. Renfro, of Atlanta, Ga., who is to begin work at once.

The stockholders have decided to extend the line from Goodwater southward to Montgomery, about 50 miles.

**Atchison, Topeka & Santa Fe.**—This company's statement for June and the half-year ending June 30 is as follows:

	June.	Six months.
Earnings.....	\$1,146,107	\$1,153,479
Expenses.....	460,522	702,173
Net earn.....	\$685,585	\$451,306

For the six months there was a decrease of \$163,307, or 2.4 per cent., in gross earnings, which was more than offset by a decrease of \$1,169,331, or 26.2 per cent., in expenses, the net earnings showing a gain of \$1,006,024, or 42.3 per cent.

**Augusta, Gibson & Sandersville.**—This company has filed articles of incorporation to build a railroad from Augusta, Ga., southwest to Sandersville, about 65 miles, with a branch from Gibson southeast to Louisville, about 25 miles.

**Baltimore & Ohio.**—Work has been begun at several points on this company's new Philadelphia Branch. Near Baltimore R. G. Huston & Co. have a large number of men and an extensive plant, and expect to push the work rapidly. The bridges over the Big and Little Gunpowder rivers have been let to James J. Ryan, who has also an extensive plant. At Northeast, Md., Driesbach & Wilcox, who have a heavy contract, have begun work, and in a short time work will be under way all along the line. A large number of the laborers for this work has been supplied by the Railroad Contractors' Bureau, of New York.

**Beach Creek, Clearfield & Southwestern.**—Mr. J. B. Reilly, contractor on this road, is building the masonry for the bridge over the Susquehanna near Williamsport, Pa., on this road. The substructure contains 7,000 cubic feet of masonry. The same contractor is also building the masonry for the bridge over Pine Creek, which will be 50 ft. above the water.

**Boston & Maine and the Eastern.**—The Boston *Advertiser* of Aug. 7, says: "The outcome of the Colby bill in the New Hampshire Legislature is still a problem open to conjecture. The Boston & Maine officials think there is no doubt of its passage next week, while some of the Eastern Railroad people opposed to the consolidation think the measure as good as dead. A railroad man of experience, and an impartial observer of the contest, says that he considers the result very doubtful. 'It is largely a question of dollars and cents,' said he, 'and it remains to be seen whether the friends of the bill will put forth enough of those potent arguments.' As regards the hostility of the Maine Central people it is stated that a large holder of the stock of that road recently said that as things now stand, he would not sell his stock at the market price, or for considerable above that figure; but that if the lease were to be effected, he would sell out for whatever he could get. It is rumored that Mr. Willard P. Phillips was recently consulted by the Boston & Maine management with a view to inducing him to withdraw his equity suit to prevent the consummation of the lease, but that Mr. Phillips refused any such action, and expressed himself confident of success in the suit."

**Brunswick & Western.**—This company has completed its bridge over the Flint River at Albany, Ga., and has laid the track on its new line from the junction, two miles east of Albany, into that town. Heretofore its trains have entered the city on the Savannah, Florida & Western track. Regular trains will begin to use the new track next week.

**Buffalo, New York & Philadelphia.**—The Clermont Branch of this road is to be extended from its present terminus at Clermont in McKean County, Pa., southwest to Johnsonburg on the Philadelphia & Erie road. The distance is about 18 miles.

**Central Pacific.**—Through traffic over the new Colorado Division, in connection with the Atlantic & Pacific road, is expected to begin in a few days.

The grading of the first section of 2½ miles of the extension

of the Oregon Division from Redding, Cal., northward, has been completed, and tracklaying has been begun. The tracks on this extension will be laid as fast as the road-bed is ready for them.

**Chicago, Burlington & Quincy.**—This company's statement for June and the half-year ending June 30 is as follows:

	June.	Six months.
Earnings.....	\$1,937,916	\$1,437,164
Expenses.....	993,228	921,041
Net earn.....	\$944,688	\$516,123

The increase in net earnings for June was very large. For the half-year there was an increase of \$2,249,587, or 24.6 per cent., in the gross earnings, accompanied by an increase of \$758,553, or 14.4 per cent., in expenses, the result being a gain of \$1,491,034, or 38.3 per cent. in net earnings.

**Chicago, Iowa & Kansas.**—This company has been organized to build a railroad from the northern boundary of Kansas, in Marshall County, southwest to Salina, about 100 miles.

**Chicago, Lyons & Pacific.**—This company has filed articles of incorporation to build a railroad from Lyons, Ia., on the Mississippi, due west across the state to a point on the Missouri River, with branches to the southern border of the state.

**Chicago & Northwestern.**—It is reported that this company will extend its Iowa Midland line from its present terminus at Anamoz, Ia., west by north to Eagle Grove, about 140 miles. This extension, if built, could be used as an outlet eastward to Clinton for the company's Northern Iowa Division and a considerable part of its Dakota lines, and would shorten somewhat the distance from those points on those lines to Chicago. The extension would be partly south and partly north of the Illinois Central's Iowa line.

**Chicago & West Michigan.**—This company will soon begin work on an extension of its White River Branch from Crooked Lake in Muskegon County, Mich., northward to Baldwin on the Flint & Pere Marquette road. The distance is 12½ miles, and the extension will give the company a connection to Ludington and Manistee.

**Cincinnati, Atlantic & Columbus.**—The Ohio Court of Common Pleas has appointed a receiver for this road, on application of several creditors who hold judgments against the company. The road is graded from Batavia, O., to Fayetteville, about 15 miles, and a little iron has been laid.

**Connotton Valley.**—President Bartlett, of this company, denies positively the reports that negotiations have been in progress for the sale of this road to the Pennsylvania Company or to any other parties.

**Denver & Rio Grande.**—The Del Norte Branch is now completed, and opened for traffic to Wagon Wheel, Col., 14 miles westward from the late terminus at South Fork, and 61 miles from the junction with the main line at Alamosa. Wagon Wheel is 311 miles from Denver by the railroad.

**Duluth & Iron Range.**—A contract was recently let for grading 23 miles of this road northward from Agate Bay, Minn., on the north shore of Lake Superior. Further contracts are to be let as soon as possible.

**Grafton & Greenbrier.**—This projected road is to run from Grafton, W. Va., on the Baltimore & Ohio, southward about 150 miles to the Chesapeake & Ohio in Greenbrier County. The grading has been completed from Grafton south to Philippi, about 24 miles, and tracklaying has been begun.

**Gulf, Colorado & Santa Fe.**—At a special meeting held in Galveston, Tex., Aug. 1, the stockholders voted to authorize an issue of second mortgage bonds to an amount not exceeding \$18,000 per mile of completed road, the proceeds of these bonds to be used for improvements and extensions of the road and for the purchase of new equipment. The new bonds will bear 6 per cent. interest, will be dated Oct. 1, 1883, and will have 40 years to run.

**Gulf, Western, Texas & Pacific.**—A survey is being made for the extension of this road from Cuero, Tex., northward about 30 miles to Gonzales, where it will connect with a branch of the Galveston, Harrisburg & San Antonio road.

**Houston, East & West Texas.**—This road is now completed to the old town of Nacogdoches, Tex., 5 miles westward from the late terminus at Lewisville and 140 miles from Houston. Work is progressing beyond the new terminus.

**Illinois Central.**—It is reported that this company has bought a controlling interest in the Mississippi & Tennessee road from the estate of the late Col. H. S. McComb. The road extends from Memphis, Tenn., southwest 100 miles to Grenada, Miss., where it connects with this company's Southern Division, which is its only connection for through business. It belongs naturally to the Southern Division, and can be used to better advantage by this company than by any one else. It has a funded debt of \$2,079,300, upon which it has earned the interest, usually with some surplus. It is said that the Central will extend it from Memphis northeast to a connection with the Southern Division, making a loop about 160 miles long to that line.

**Illinois Midland.**—It is said that the Terre Haute & Indianapolis Co. contemplates the purchase of this road when it is sold under foreclosure, and that representatives of the company have been negotiating with the English bondholders for the purchase of their claims. A majority of the bonds are owned in England. The road is not a valuable property, but the Terre Haute & Indianapolis Co. could doubtless make more of it than any one else could. Arguments in the foreclosure suit began Aug. 7.

**Kansas City, Lawrence & Southern Kansas.**—This company's statement for June and the half-year ending June 30 is as follows:

	June.	Six months.
Earnings.....	\$114,978	\$97,776
Expenses.....	60,445	49,569
Net earn.....	\$54,533	\$48,207

For the half-year there was an increase of \$229,266, or 49.2 per cent., in gross earnings, with an increase of \$94,200, or 36.8 per cent., in expenses, the result being a gain in net earnings of \$135,066, or 64.3 per cent., in net earnings.

This company will hereafter be known as the Southern Kansas, the name having been changed on consolidation with its branch lines.

**Kansas Railroad Commission.**—A telegram from Topeka to the *Chicago Tribune* says:

"The law creating the present board provides for two classes of complaints, which may be presented to the Commission for investigation and determination. The first class comprehends all individual grievances concerning transpor-

tation, or anything connected with the freight department, and such cases are to be dealt with in a summary and informal way. It has been so arranged that no formal complaints are necessary further than a notification by letter to any member of the board. In this way the technicalities of court proceedings, as well as the expenses of attorneys' fees, have been guarded against by the Commissioners in forming a basis for their operations. These letters of notification are to state as explicitly as may be the nature of the grievance, whether it be an overcharge in transportation, lack of car facilities, delay of business, damage to merchandise, discrimination between individual consignors or consignees, extortionate charges on the part of the railroad, or any other grievance a party may suffer arising from business transacted with the railroad lines in Kansas. Upon receiving this notification the particular matter to be inquired into is at once referred to the railroad company directly concerned, with a request that the trouble complained of be rectified. In case the company fails to redress the grievance, the Commission will fix a time and place for a hearing, giving each party ten days' notice, at which time a thorough investigation will be made and the fact determined accordingly.

"The second class of grievances comprehends complaints as to the rate of the tariff charged by any company, the condition of a railroad in any given locality in the state, or the manner of its operation. This class of complaints must be made through the Mayor and Council of a city, or the Trustees of a township through which the road runs. The board, when receiving such a complaint, will set a time and place of hearing, giving each party ten days' notice and investigating fully, as in the other class of cases referred to.

"The board is in continuous session so far as the receiving and hearing of ordinary complaints are concerned. The object of the Commission is always to secure redress to parties aggrieved with the least possible delay and expense. Where evidence is required to substantiate complaints, either affidavits or oral testimony may be accepted, as may best suit the convenience of parties. When complaints of a serious character are developed, requiring a more careful and minute examination to reach a proper determination, the Commissioners will visit the locality and make the investigation where the evil is alleged to exist. The principal aim of the Commission will be to keep such cases as come under their supervision out of the courts, avoid as much as possible all expense to both parties in the controversy, and, in short, to bring to a just settlement all difficulties arising between the individual and the corporation or between competing railroads, and to fully protect the rights of the people."

**Lehigh Valley.**—This company, whose trains reach Buffalo over the New York, Lake Erie & Western track, has for some time desired to establish its own passenger and freight stations in that city, accommodations for its coal traffic being already provided by the Buffalo Creek road, which it owns. For this purpose it bought some time ago the right of way and property suitable for yards and stations, but further progress was stopped by inability to agree with the New York Central as to the crossing of that company's tracks at Scott street. The matter was taken to the Supreme Court finally, and a commission appointed according to law. The commissioners last week submitted their report, permitting Lehigh Valley to the cross the Central tracks at grade, and requiring it to pay the Central for such crossing the sum of \$40,000, to pay the cost of putting in the crossing and to comply with the following conditions:

To construct and maintain a signal tower with suitable local and distance signal apparatus, the first cost not to exceed \$5,000.

To pay the wages of their signal men, who shall be appointed and controlled by the New York Central.

To have all its trains and engines come to a full stop at a distance not less than 200 ft. from the point of crossing, and not proceed until the proper signal is given by the watchman.

In the use of said crossing, the following shall be the order of priority of use as to the trains of each company:

First. The passenger trains of the Lehigh Valley, running on schedule time.

Second. The made-up freight trains of the New York Central & Hudson River road.

Third. The made-up freight trains of the Lehigh Valley.

Fourth. The switching of the New York Central & Hudson River.

Fifth. The switching of the Lehigh Valley.

The Lehigh Valley Railway Co. shall be limited in its use of the crossing at any one time to 15 minutes, if during the 15 minutes a Central train or engine approaches to pass it; and the same rule shall apply to the use of the crossing by the New York Central.

Whenever the crossing is vacant, the signal shall be set in favor of the New York Central.

Whenever a passenger train approaches the crossing, the signal shall be given to the former as soon as the crossing can be cleared.

Neither company shall allow its trains or agents to pass over the crossing, until the signal is set in their favor.

As soon as the report had been properly signed and submitted to the Court, the Lehigh Valley representatives at once paid over to the Central the \$40,000 required by its terms.

This company's engineers are making a survey for a branch from Slatington, Pa., west by south to Port Clinton, about 30 miles.

**Louisville, Evansville & St. Louis.**—It is again reported that negotiations are nearly completed for the lease of this road to the Evansville & Terre Haute Co. Nothing has been said about the terms of the lease.

**Mexican Central.**—The *Mexican Financier* says: "The report of work done on the Mexican Central Railway for the month of May shows that the amount of track completed on the main line from Mexico toward Aguascalientes was 538 kilometres; Guanajuato Branch, 18,706 kilometres; sidings, 31,011 kilometres; Tampico line, 95,006; Chihuahua Division (up to May 16), 600 kilometres; making a total of 1,282,723 kilometres, or a little over 808 miles. On the Pacific Division 17 kilometres of grading had been finished. The total length of telegraph line constructed amounted to 1,324 kilometres. The number of men employed was, on the main line between Mexico and Zacatecas, 18,174; from Tampico to San Luis Potosi, 3,600; Pacific Division, 185; from Paso del Norte and Durango, 2,000; making a total of 23,959. The number of sleepers bought for the main line during the month was 49,180; and for the line between Paso del Norte and Durango, 78,383. The report states that in July the provisional bridge at Encarnacion will be finished, after which the track would be rapidly laid between that point and Aguascalientes. The company requests permission, before putting in the permanent iron bridges lacking between Lagos and Encarnacion, to run its trains over the short stretch of track between 6 and 12 o'clock, making one trip each way. This could be done without danger to the passengers, and by this means the rough diligence journey between Lagos and Aguascalientes could be reduced by so

much. The locomotive arrived in Hualajuilla, Chihuahua, on May 16."

**Mexican Railroad Notes.**—The following notes are from the *Mexican Financier* of July 21:

The contractors for the Mexican Southern (Gould-De Gress concession) have received orders to resume their work. It is announced that work on the railway from Toluca to San Juan de las Huertas will soon begin.

The new tramway in Leon, from the municipal palace to the penitentiary, is nearly finished.

The permanent bridge of the International Railway (Frisbie concession) across the Rio Grande at Piedras Negras has been finished, and the track of the company laid as far as the Sabanas River, a distance of 117 kilometres, or about 73 miles. The government has ordered the inspection of the same. The company is building a splendid stone bridge over the Sabanas.

The inspector for the northern line (section from Acámbaro to San Luis Potosí) of the Mexican National, Mr. José M. Romero, in his report for June says that on the Acámbaro Celaya Division the work on the Pratt truss iron bridge across the Lerma River at Acámbaro has proceeded. The ballasting of the track from Acámbaro to Salvatierra has been finished. Between Salvatierra and Celaya 8 kilometres of track have been laid and ballasted. On the division from Celaya to San Luis Potosí 43 kilometres have been graded from the intersection with the Mexican Central in the suburbs of the city of Celaya. Railway work has been much interrupted by the prolonged season of rains, but notwithstanding this the work on this division has advanced with notable rapidity. The inspector pays a high compliment to Mr. W. H. Burr, the Engineer in Charge, to whom, he says, is owing the excellent condition and progress of the work.

**Milwaukee, Lake Shore & Western.**—The main line of this road is now completed to Eagle River, Wis., 10 miles northward from the late terminus at Three Lakes, and 266 miles from Milwaukee. Regular trains run to the new terminus.

**Miramichi Valley.**—A dispute among the corporators of this New Brunswick road resulted last week in the holding of two meetings, one at Fredericton, N. B., and one at Newcastle, and in the choice of two rival boards of directors, whose claims will, doubtless, have to be settled by the courts before anything can be done toward building the road.

**Midland North Carolina.**—A committee of the Boston stockholders has been appointed to wind up the affairs of this company and save what is possible from the wreck. The company, it will be remembered, leased the Atlantic & North Carolina road for a time, and built an extension from Goldsboro, N. C., to Smithfield, 22 miles. Some \$500,000 of Boston capital was invested in the enterprise under the management of W. J. Best, who figured in several other North Carolina schemes. The lease of the Atlantic & North Carolina has been forfeited, and about the only property remaining is the 22 miles of poorly built road, which is close to the North Carolina Railroad and of little value.

**Mississippi & Tennessee.**—It is reported that the controlling interest in this road owned by the estate of the late H. S. McComb has been sold to the Illinois Central Co., as stated more fully elsewhere.

**New York Central & Hudson River.**—This company reports to the State Comptroller of New York that its gross earnings for the year ending June 30, last, were \$28,929,445. The state tax on this amount will be \$144,647. This statement, we believe, does not include some of the miscellaneous receipts, upon which, the company claims, taxes cannot be assessed under the law. For the year, ending June 30, 1888, the company reported its gross earnings at \$24,557,041, showing an increase last year of \$4,372,404, or 17.8 per cent., and a consequent increase of \$21,862 in the tax to be paid.

**New York & Greenwood Lake.**—Surveys are being made for a branch of this road from Montclair, N. J., through Caldwell to Morristown, about 12 miles. The line was surveyed some 13 years ago, and a little grading was done on it, including the beginning of work on a tunnel through the Orange Mountain west of Montclair. It is said that several routes will be surveyed, one following the old line, another leaving the main line at the Great Notch above Montclair, and a third passing through Van Giesen's Gap. The proposed branch passes through a very beautiful country.

**New York, Lake Erie & Western.**—Preparations are in progress for a second track on the Western Division from Hornellsville, N. Y., to Salamanca. Most of the work so far has been done on the bridges and masonry. In connection with this work several new iron bridges are to be put up.

**New York & New England.**—An additional section of the second track from Franklin, Mass., to South Bellingham, 5 miles, is completed and ready for use.

The company has concluded an agreement for exchange of business with the new Milford, Franklin & Providence road, and for the lease of the road, to begin two years from date; also for a lease of the Rockville road, a short branch to Rockville, Conn. The President has been authorized to give the company's consent as lessee to the extension of the Norwich & Worcester road from Allyn's point to Groton.

**New York, Texas & Mexican.**—A survey is in progress for an extension of this road from Rosenberg, Tex., northeast to Houston, about 25 miles.

**Ohio & Mississippi.**—This company has executed and filed for record the general mortgage provided for in the plan of adjustment of its affairs which was approved last year by the stockholders. The mortgage is for \$16,000,000, and is made to Cyrus C. Hines, of Indiana, and the Union Trust Co., of New York, as trustees. It is provided in the mortgage that \$12,784,000 of the bonds to be issued are to be reserved to provide for prior liens on the road.

**Oregon Railway & Navigation Co.**—This company's statement for July, the first month of its fiscal year, is as follows:

	1888.	1889.	Increase.	P. c.
Earnings.....	\$461,350	\$492,327	\$30,977	6.7
Expenses.....	229,500	201,979	27,521	13.6
Net earnings.....	\$231,850	\$290,348	\$58,498	25.2

The company's railroad and ocean lines are reported as showing a large increase this year, both in freight and passenger business.

**Pennsylvania.**—The stockholders of the Pennsylvania Schuylkill Valley Co. have formally approved the issue of bonds upon the road, and also its perpetual lease to the Pennsylvania Railroad Co. This is the corporation which is building the new line to Reading.

The City Council of Reading, Pa., has passed an ordinance giving the new line permission to enter the city, and authorizing to lay its tracks on certain streets, and to cross others where necessary to reach its proposed terminus in

the city. The ordinance was passed unanimously, although arguments in opposition were presented by counsel for the Philadelphia & Reading Co., and it was promptly approved by the Mayor.

A report that this company has leased or bought the Wilmington & Northern road has not been confirmed.

**Princeton & Western.**—This company has filed articles of incorporation to build a railroad from Princeton, Wis., on the Chicago & Northwestern road, westward to Valley Junction on the Chicago, St. Paul, Minneapolis & Omaha, a distance of about 75 miles.

**Rochester & Pittsburgh.**—Regular trains began to run over the Buffalo Division of this road Aug. 6. For the present mixed trains only will be run, as there is still some work to be done ballasting the tracks.

**Rome, Watertown & Ogdensburg.**—This company makes the following statement for the month of June:

	1888.	1889.	Incr. or Dec.	P. c.
Earnings.....	\$143,206	\$138,028	\$5,178	3.8
Expenses.....	101,371	113,039	\$11,668	10.3
Net earnings.....	\$41,835	\$24,989	\$16,846	67.4

In relation to the Carleton accident, it is stated that in the many years the road has been in operation, up to the time of that accident, but two passengers had been killed by causes beyond their own control.

**St. Joseph, Joplin & Gulf.**—This company has filed articles of incorporation to build a railroad from Elwood, Kan., on the Missouri, opposite St. Joseph, Mo., southward through Kansas and to Joplin, Mo., with an extension thence southward through Arkansas and Louisiana to New Orleans.

**St. Joseph & Western.**—A movement has been begun among the second-mortgage bondholders to secure the appointment of a receiver for this road. The road has been operated by the Union Pacific Co. for several years, but no interest is paid on the bonds. The earnings as reported have barely equaled the working expenses of the road.

**St. Louis, Emporia & Denver.**—This company has been organized to build a railroad from St. Louis to Denver, Col., passing through Emporia, Kan. The distance is about 950 miles.

**South Carolina.**—Charleston dispatches report that this company has agreed to extend its Camden Branch from Camden, S. C., northeast through Society Hill and Bennettsville to the North Carolina line, to connect with the southern extension of the Cape Fear & Yadkin Valley road. The extension will be about 75 miles long, and will be generally parallel to and about 25 miles north of the Wilmington, Columbia & Augusta road.

A branch has been completed and opened for business from Ten-mile, S. C., 11 miles from Charleston, westward 3½ miles to Lamb's. It is called the Ten-mile Branch.

**Southeastern, of Canada.**—This company is probably seriously embarrassed by the failure of its President and chief owner, Bradley Barlow, of St. Albans, Vt. Mr. Barlow became the owner of a controlling interest in the road some years ago and has carried it along since then, investing in it all the money he had or could control. Some months ago he gave the Canadian Pacific Co. an option for the purchase of the road, but that company has not thus far availed itself of the option, and this is understood to be the chief immediate cause of Mr. Barlow's failure. The company is said to have a floating debt of nearly \$800,000, chiefly incurred in building branches which have not been profitable. The total issue of bonds \$1,750,000, has been pledged by Mr. Barlow to secure a loan of \$1,250,000 from the Canadian Pacific, made when the option to buy the road was given.

**Telegraph Operators' Strike.**—The strike of the telegraph operators continues, and it may be said, with less prospect of success for the men than a week ago. Beyond question the telegraph service given by the Western Union Co. is defective at many points, and is worse than the company would like to have it appear, but the service is kept up, and so far as is known, the number of men employed by the company is increasing, while the operators taken up temporarily are improving. At any rate there has not been the general breakdown which was probably expected by the strikers, and this is so much against them. In a strike of this kind, too, the mere lapse of time counts against the strikers, and its continuance for three weeks is another point. It was expected that this week the railroad operators on the Delaware, Lackawanna & Western, the Baltimore & Ohio and the Wabash would strike, and that they would be followed in a few days by those on the Gould Southwestern lines. This movement among the railroad operators, however, has not been very general, and comparatively few of them left their places, so few, indeed, that it could hardly be called a general strike anywhere except on the Pittsburgh Division of the Baltimore & Ohio. Whether it will extend further remains to be seen.

Up to the present time the strikers have been very quiet, and their behavior has been worthy of all commendation. On Monday night of the present week and again on the following night some of the principal Western Union wires were cut at points near New York, where a large number of wires come together. This is said to be the work of striking linemen. It is entirely against the orders of the Brotherhood, and its members say that it may have been the work of a few reckless linemen, rendered desperate by the long continuance of the strike. Some even go so far as to say that the wires were cut by men in the employ of the company, the object being to cause a change in public opinion, which has so far been rather with the operators. This is hardly probable, and no proof of the charge has been brought forward. At any rate, the great body of the strikers have maintained an excellent attitude, and claim that they ought not to be held responsible for the acts of a few lawless men among them, which they earnestly disclaim.

**Texas & St. Louis.**—The bridge over the Arkansas River at Rob Roy, Ark., has at last been completed, and the company has now a continuous line from Bird's Point, Mo., opposite Cairo, to Gatesville, Tex., 720 miles. Through trains will begin to run about Aug. 12. The company will make its St. Louis connections over the Illinois Central and the Cairo Short Line.

**Toledo, Cincinnati & St. Louis.**—The United States Circuit Court last week granted the application for the appointment of a receiver. Several names were suggested by parties interested, but the Court appointed Mr. E. E. Dwight, Manager of the road, to the position.

The following statement has been made by President E. B. Phillips in reply to some animadversions, expressed or implied, upon his management:

"Among the conditions under which I accepted the presidency of the road was the assurance I should be furnished, during the year 1888, the sum of \$600,000 for the improvement of the property, \$450,000 of which should be paid on or before July 10. Every one conversant with the facts

will bear witness that I stated this necessity at the outset, and have continually repeated it since.

"It is true that some \$5,000 of the early payments were anticipated, and that at the present time, notwithstanding a shortage of \$50,000 in debenture subscription, together with about \$70,000 additional, which was expended from the Delphos Trust, there has been a sum about equal to the first seven calls, or \$450,000, paid in. But of this money much was of necessity diverted to uses other than the improvement of the road; and of the \$450,000, only \$275,000, or 59 per cent., has been used for the improvement of the road. This latter amount has been expended approximately as follows:

"As the accounts are at the West, it is impossible for me at the present writing to give the following items with exactness. The items so shown are estimates. I can safely say that nearly one-half has been paid for labor rolls and old claims which accrued before the road came into my hands, say \$125,000; upon Toledo improvements, \$25,000; upon extensions of the road to St. Louis and to Ironton, and which was not included in my estimate, as it was supposed the Delphos Trust would pay such expenditure, \$75,000; for 700 tons of steel rail, \$32,000; total, \$257,000.

"From the above it will be seen that apart from the Toledo improvements and rails I have practically received nothing for the improvement of the road (585 miles) which was being operated when I became President.

"Under these circumstances, could it be expected that the road would be supplied with terminals, stations, steel rails, side tracks, ballast and fencing, all of which are absolutely essential to its development and success?

"But even under the necessity of expending the money to complete the unfinished road, could I have had the promise of \$600,000 in the year, or even the \$500,000 which was paid or payable on or before July 1, I have not a doubt that the road might have been carried through and a necessity for a receiver avoided. Two hundred and thirty thousand dollars more money would have made a great difference in the result.

"I have had and still entertain great faith in the outcome of the enterprise which has been forced to succumb to the inevitable for want of money and lack of faith among its friends.

"I believe it is now in good hands, and that the Receiver, Mr. Dwight, will do for it all any one can accomplish.

"I am not aware of having promised any special results. I have always stated that the money must be furnished, giving as my belief that if I had that money the road would be a success.

"This I still believe. While it has turned out unfortunately, I wish to emphatically disclaim misstatement of facts or breach of promises.

"A statement showing the financial standing of the company and its indebtedness will be made at an early day."

**Toledo & Indianapolis.**—It is reported that this road has been sold to a syndicate of New York men, who purpose extending it from its present terminus at Findlay, O., south by east to Columbus. The road is now in operation from Toledo south to Findlay, about 44 miles. The extension would be about 85 miles long, through a section already pretty well provided with railroads. The terms of the sale are not stated, except that the purchasers are to provide for the floating debt.

**Topeka & Ottawa.**—This company has been organized to build a railroad from Ottawa, Kan., northwest to Topeka, about 40 miles.

**Vandalia & Springfield.**—This company was recently organized to build a railroad from Springfield, Ill., to Vandalia, about 74 miles. A preliminary survey has been completed, and a very good line found, on which the road can be very cheaply constructed.

**Wabash, St. Louis & Pacific.**—The assignments of these company's lines to the several divisions is as follows: Eastern Division.—Toledo to Tilton, 251.5 miles; Tilton to Cairo, 257.6; Vincennes to St. Francisville, 9.2; Detroit to Logansport, 207.2; Indianapolis to Michigan City, 161.0; West Lebanon to Leroy (narrow-gauge), 76.0; Toledo to Milan, 30.0; Covington Branch, 14.5. Total, 1,007.9 miles.

Middle Division.—Chicago to St. Louis, 285.1; Braidwood Branch, 13.0; Tilton to Bement, 51.9; Decatur to Quincy, 150.7; Edwardsville Branch, 8.5; Hannibal Branch, 50.1; Pittsfield Branch, 6.2; Clayton to Elvartown, 34.5; Quincy to Trenton, 136.0; Bement to Effingham, 61.1; Shumway to Altamont, 10.4; Decatur to White Heath, 29.7; Jerseyville Branch, 71.4. Total, 908.6 miles.

Northern Division.—Logansport to Keokuk, 284.7; Burlington Branch, 19.7; Warsaw Branch, 5.0; Keokuk to Des Moines, 183.3; Centerville to Humeston, 39.0; Fairbury to Streator, 31.7; Sidney to Havana, 111.9; Peoria to Jacksonville, 83.0; Havana to Springfield, 47.2. Total, 805.5 miles.

Western Division.—St. Louis to Kansas City, 276.8; St. Louis to Ferguson (Biddle St. Line), 10.1; North Branch, 131.0; Brunswick to Council Bluffs, 224.5; Clarinda Branch, 21.5; St. Joseph Branch, 69.0; Glasgow Branch, 15.0; Columbia Branch, 21.0. Total, 769.7 miles.

Des Moines & Northwestern Railway (narrow-gauge), 115.0 miles.

**Western & Atlantic.**—The question of discontinuing all legal proceedings for the forfeiture of the lease of this road is now under consideration in the lower house of the Georgia Legislature. The Judiciary Committee has presented two reports on the question, the majority recommending the discontinuance of proceedings provided the lessee company agrees to pay the expenses of the suit and to file an additional bond for \$500,000, while the minority report recommends that the Legislature direct all proceedings in the *quo warranto* suit to be discontinued without any conditions. The Senate has approved the minority report.

**Wilmington & Northern.**—It was reported last week that this road, which extends from Wilmington, Del., to Reading, Pa., had been sold or leased to the Pennsylvania Railroad Co. The report has since been denied by Mr. Victor Dupont, of Wilmington, whose family owns a controlling interest in the road.

## ANNUAL REPORTS.

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Charlotte, Col. & Augusta	23	Norfolk Central	129
Chesapeake & Ohio	158	Northern (New Hampshire)	19
Cheshire	230	Northwestern Ohio	195
Chicago & Alton	122.142	Ogdensburg & L. Champlain	407
Chicago, Bur. & Quincy	2.104.253	Ohio & Mississippi	106
Chi. Mil. & St. Paul	73.167.293.295	Oregon Improvement Co.	278
Chi. Rock Island & Pacific	340.443	Panama	511
Cincinnati & Eastern	463	Pacific Mail Steamship Co.	478
Cincinnati, Ham. & Dayton	403	Pennsylvania	251
Cincinnati, N. O. & Tex. P. Co.	39.395	Pennsylvania Company	494
Cleve. C. I. Co. & Ind.	181.181	Pennsylvania R.R.	150.154
Cleveland & Pittsburgh	39.495	Philadelphia & Reading	41
Columbia & Greenville	39	Phila. W. & Baltimore	139
Concord	356	Pittsburgh, Cin. & St. Louis	312
Connecticut River	1.5	Pitts. Ft. Wayne & Chi.	349.495
Delaware & Hudson Canal	100.122	Pittsburgh & Lake Erie	40
Delaware, Lacka. & Western	122	Portland & Ogdensburg	100
Det. Lac. & W. Leased Lines	4.7	Portland & Rochester	100
Des Moines & Fort Dodge	362	Providence & Worcester	1.4
Denver & Rio Grande	392	Rochester & Pittsburgh	100
Erie & Pittsburgh	405	Rutland	511
European & North American	22	St. Joseph & Western	477
Fitchburg	40	St. Louis, Iron Mt. & So.	167.241
Flint & Pere Marquette	262	St. Louis & San Francisco	4.7
Georgia	512	St. L. Vandalia & Terre Haute	216
Grand Trunk	60.239	St. Paul & Duluth	04
Hannibal & St. Joseph	163	St. Paul, Minn. & Manitoba	510
Hanover Junc. Han. & Gettysburg	355	Savannah, Florida & West.	4.7
Hartford & Conn. Western	167.180.182	Sioux City & Pacific	213
Housatonic	196	South Carolina	39.121
Houston & Texas Central	39	Sullivan County	427
Huntington & Broad Top	121	Superior	100
Illinois Central	167.180.182	Terre Haute & Indianapolis	362
Indiana Bloom. & Western	463	Texas & Pacific	231
Indianapolis & Vincennes	405	Toledo, Ann Arbor & Gd. Trk.	5.0
International & Great No.	231	Union Pacific	104
Jeffersonville, Madison & Ind.	493	Utah Central	246
Kentucky Central	246	Valley of Ohio	280
Lake Shore & Mich. So.	278.298.396	Vermont Valley	427
Lawrence	495	Virginia Midland	100
Lehigh Coal & Navigation Co.	138	Wabash, St. Louis & Pac.	167.180
Lehigh Valley	73	Warren	407
Little Rock & Ft. Smith	278	Western R. R. Association	37
Long Island	73	West Va. Central & Pittsburgh	312
Louisville & Nashville	51	Woodstock	100
Maine Central	21	Worcester & Nashua	40
Manchester & Lawrence	395	York & Peachbottom	355
Manhattan	181		

## Chicago, St. Paul, Minneapolis &amp; Omaha.

At the close of the year ending Dec. 31, 1887, which is covered by its annual report just issued, this company operated 1,149.72 miles of road, an increase during the year of 111.89 miles, as shown in detail below.

The lines worked at the close of the year were, in detail, as follows:

Eastern Division:	Miles.
Elroy to St. Paul	197.60
St. Paul to Minneapolis	9.90
Stillwater Branch (Stillwater Junc. to Stillwater)	3.80
South Stillwater line (Stillwater via South Stillwater to Hudson Bridge)	4.39
River Falls Branch (Hudson to River Falls, Wis.)	12.21
Ran. Claire Branch (Eau Claire to L. Claire Mills)	12.7
Neillsville Branch (Meridian to Neillsville)	14.00
Chippewa Falls Branch (Chippewa Falls to Bloomer)	14.50
	250.14
Northern Division:	
North Wisconsin Junction to Cable, Wis.	120.00
Superior City Branch (Superior Junc. to Superior City, Wis.)	62.00
	182.00
St. Paul Division:	
St. Paul to St. James, Minn.	122.00
Lake Crystal to Elmore	44.00
	166.00
Sioux City Division:	
St. James to Sioux City, Ia.	148.00
Sioux Falls Branch (Sioux Falls Junc. to Salem)	98.00
Rock River Branch (Laverne to Doon)	28.00
Black Hills Branch (Heron Lake to Woodstock)	44.00
	318.00
Nebraska Division:	
Missouri River Transfer (between Sioux City and Covington)	2.25
Covington to Omaha	125.50
Nobara Branch (Coburn Junc. to Ponca, Neb.)	15.82
Norfolk Branch (Emerson to Norfolk)	46.50
	190.07
Total C., St. P., M. and O. Ry.	1,115.21
Proprietary Roads:	
Menominee Railway (Menominee Junction to Menominee)	3.01
Chippewa Falls and Northern Railway (Bloomer to Rice Lake, Wis.)	31.50
	34.51
Grand total	1,149.72

The average mileage worked for the year, not including proprietary lines, was 1,044.30 miles in 1882, and 967.87 miles in 1881.

The equipment consists of 165 locomotives; 50 first-class passenger, 10 second-class passenger, 2 sleeping, 3 mail and 31 baggage and express cars; 3,059 box, 210 stock, 1,273 flat and 97 caboose cars; 2 officers' and pay cars, 7 derrick and tool cars; 3 pile drivers and 3 steam shovels; 1 transfer steamboat and 2 barge pile drivers.

The number of acres of land sold during the year 1882 was 178,048.50 acres. Number of acres of land remaining unsold at the close of the year, 750,229.14 acres.

ash collected during year on account of lands sold and payments on existing contracts, interests, etc. \$591,785 less expenses, taxes, etc. 44,239

Balance of net receipts \$546,825  
did not proceeds of land and stumpage sold on account of the Superior land grant, and town lots in Nebraska, not included in income account. 16,200

Total \$563,026

In addition to the net cash receipts, as shown above, the company holds bills receivable and contracts for lands sold amounting to \$1,369,991.

The general account is as follows, condensed:

Common stock	\$18,573,233.33
Preferred stock	10,759,933.31
unded debt	10,509,487.50
Minneapolis Eastern bonds guaranteed	75,000.00
Bills, accounts and balances payable	800,689.44
Accrued interest and January dividend	422,571.74
Income account, balance	1,100,768.91
Total	\$31,241,684.23
oad and equipment	\$47,086,138.31
Advances to proprietary roads	1,088,364.88
Stocks and bonds owned	1,069,229.45
Co.'s stock and bonds on hand	78,677.82
Materials and fuel	722,382.66
Bills, accounts and balances	354,928.12
Cash	850,962.99
Total	\$51,241,684.23

The funded debt consists of \$3,000,000 Chicago, St. Paul & Minneapolis first-mortgage, \$800,000 North Wisconsin first-mortgage, \$125,000 Hudson & River Falls first-mortgage, \$6,080,000 St. Paul & Sioux City first-mortgage, \$34,800 St. Paul, Stillwater & Taylor's Falls first-mortgage, \$30,000 St. Paul depot mortgage, and \$9,139,687.50

consolidated bonds. There are also \$75,000 Minneapolis Eastern bonds guaranteed, making the total interest charge \$1,180,867 yearly.

During the year the capital stock was increased on account of 46 miles Norfolk line, 14 miles Chippewa Falls & Northern Railroad, 20 miles Superior Branch and 20 miles Bayfield Extension, \$1,509,900 common and \$1,000,600 preferred, being at the rate of \$15,000 per mile of common and \$10,000 per mile of preferred; total, \$2,510,500, less unused, \$267,500, making the increase \$2,243,000. The bonded debt was increased during the year \$1,719,312 by the issue of Chicago, St. Paul, Minneapolis & Omaha consolidated mortgage bonds at the rate of \$15,000 per mile on the lines above named, and on the Black River road, 14 miles.

The traffic for the year was as follows:

	1882.	1881.	Inc. or Dec.	P. c.
Passenger train miles	875,302	3,103,760	D.	281.794
Freight train miles	1,946,664			
Total locomotive miles	4,621,418	3,935,540	I.	685.878
Passengers carried	821,436	622,810	I.	198.617
Passenger miles	53,755,630	38,706,890	I.	15,048,740
Tons freight carried	1,940,031	1,476,129	I.	463,902
Ton-miles	375,824,581	307,799,338	I.	68,034,243
Passengers, No.	61			
Freight, tons	142			
Av. receipt:				
Per pass.-mile	2.45 cts.	2.43 cts.	I.	0.02 ct.
Per ton-mile	1.26 "	1.40 "	D.	0.14 "

The cost of locomotive service last year was 25.71 cents per mile run. Passenger trains earned \$1.68 and freight trains \$1.80 per mile run, the average for all trains being \$1.76, and the expenses \$1.15, leaving the net earnings \$0.61 per mile run.

The earnings for the year were as follows:

	1882.	1881.	Inc. or Dec.	P. c.
Freight	\$3,478,24	\$2,913,521	I.	\$565,103
Passengers	1,311,217	944,329	I.	366,888
Mail and express	139,885	119,461	I.	20,424
Miscellaneous	32,476	44,650	D.	12,174
Total	\$4,962,202	\$4,021,961	I.	\$940,241
Expenses	3,240,787	2,776,460	I.	464,327
Net earnings	\$1,721,415	\$1,245,501	I.	475,914
Gross earn. per mile	4.752	4.155	I.	507
Net	1.048	1.287	I.	301
Per cent. of exps.	65.31	69.03	D.	3.72

Taxes are included in the expenses; they were \$172,474.15 in 1882, and \$142,483.84 in 1881, amounting last year to 5.32 per cent. of the total expenses, or to 3.48 per cent. of gross earnings.

The income account for the year may be stated as follows:

Net earnings of road, as above	\$1,721,415.35
Net proceeds from proprietary roads	644.46
Net proceeds from Land Department	546,825.38
Total	\$2,268,885.17
Interest	\$1,014,529.65
Re-taxes	27,736.41
Dividends on preferred stock, 7 per cent.	735,397.25
Surplus for the year	\$491,221.86
Balance, Jan. 1, 1882	609,547.05
Income account, balance, Jan. 1, 1883	\$1,100,768.91

It will be seen from this statement that only \$55,603.52 of the total amount required to pay all charges and 7 per cent. on the preferred stock was derived from the receipts of the Land Department.

The charges to construction account during the year were as follows:

New lines built, second track, real estate, build- ings, etc.	\$2,498,548.04
New equipment	1,121,328.40
Discount on bonds sold	75,895.14
Discount on stock sold	2,041,173.98
Total	\$5,736,946.46

The principal charges to construction, outside of new lines built, were for steel rails and improvements of track; for new sidings and enlargement of yards, and for new shops and engine-houses.

A large amount of work was done during the year on improvements of roads, bridges and buildings in addition to the new tracks built. The Florence Cut-off, near Omaha, was begun, but its completion was prevented by unforeseen difficulties.

Equipment was increased during the year by the purchase of 40 locomotives, 9 passenger and baggage cars, 1,131 freight cars, 24 caboose cars, 5 tool cars and 1 pile driver.

A second track was laid on the Eastern Division from East St. Paul to Post's, from Midvale to Oakdale, and from Elmo to Stillwater Junction, 8 miles.

The report says: "Of the new lines in process of construction at date of last annual report the Norfolk Branch has been completed and is in operation, 19.91 miles of track having been laid and the line equipped with depot buildings, stock yards and water stations. Terminal facilities at Norfolk, owned jointly with the Union Pacific Railroad Co., afforded excellent means of transfer with that road. Connection is had at this point also with the Sioux City & Pacific road. In Wisconsin the line of the Superior Branch was completed from a point nine miles above Superior Junction to a connection with the Northern Pacific near Superior City, a distance of 51.42 miles. For the construction of this line the company will receive 10 sections per mile of valuable pine land under the Wisconsin legislation of 1882. On the fourth and fifth extensions of the Northern Division, 26 miles of track were laid and ballasted and considerable grading and bridging done between the end of the track and Bayfield. A line was graded into Ashland upon a location well calculated to accommodate the business of the mills at that place and to materially increase the lumber traffic of the road. The track of the Chippewa Falls & Northern Railway, a proprietary road, was extended from Bloomer to within less than three miles of Chicago Junction on the Northern Division, a distance of 52 miles, making a total of 149.33 miles new track laid on all divisions during the year. It is expected that the grade of the Northern Division will be finished to Bayfield ready for the track by July 1, 1883, a distance of 29 miles from the end of the tracks at present laid. \* \* Grading and bridging of the branch to Ashland are finished. This line will be ready for operation by July 15, 1883. Considerable ballasting remains to be done upon the Superior Branch."

## Mobile &amp; Girard.

This company owns a line from Columbus, Ga., to Troy, Ala., 84 miles. It is controlled by the Central, of Georgia. The report is for the year ending May 31.

The equipment consists of 7 engines; 7 passenger and 3 mail and baggage cars; 86 box, 44 flat, 21 coal and 3 caboose cars.

The general account is as follows, condensed:

Common stock	\$987,674.01
Preferred	279,801.20
Pike Co.	4,630.00
Funded debt	1,085,000.00
Total	\$2,357,035.21
Construction	\$2,003,809.80
Profit and loss	301,150.20
Bills, accounts and balances	51,714.32
Cash	360.80
Total	\$2,357,035.21

The funded debt consists of \$266,000 second-mortgage 8 per cent. bonds; \$800,000 third-mortgage 4 per cent. bonds, and \$19,000 third-mortgage 6 per cent. bonds. The first-mortgage bonds have all been paid off. The interest charge is \$54,420 yearly. During the year \$34,000 second-mortgage bonds and \$14,000 third-mortgage 6 per cent. bonds were retired.

The traffic report is as follows:

Train-miles	173,575
Passengers carried	59,341
Bales cotton carried	88,695

Of the cotton carried 14,068 bales were local freight to Columbus, and 74,627 bales were through freight.

The earnings for the year were as follows:

	1882-83.	1881-82.	Inc. or Dec.	P. c.
Freight	\$197,602	\$210,089	D.	\$12,487
Passage	54,063	54,963	D.	900
Mails	4,091	3,959	I.	132
Total	\$255,756	\$269,011	D.	\$13,255
Expenses	178,300	209,568	D.	31,268
Net earnings	\$77,456	\$59,443	I.	\$18,013
Gross earn. per mile	3.045	3.203	D.	158
Net	922	708	I.	214
Per cent. of exps.	69.72	77.90	D.	8.18

The loss in earnings was due chiefly to diversion of grain traffic and other freight from the northwest.

During the year 453 tons of steel rails and 30,978 new ties were used; 1,964 old rails were fitted with fish plate joints. Two new passenger cars were received, and 32 freight cars were supplied with new iron trucks and standard axles.

The income account is as follows:

Net earnings	\$77,455.78
Stock account, loans, etc.	4,637.43
Reserved fund	40,967.18
Cash on hand, June 1, 1882	845.97
Total	\$124,206.36
Interest	\$50,649.15
Bonds paid off	48,000.00
Central R. R. Bank and other accounts	16,106.41
	123,845.56

Cash on hand May 31, 1883. \$360.80

The report refers to the decrease in earnings due to the causes stated above, and also to a reduction in rates. An extension of the road from Troy to Elba, 30 miles, has been decided on, and an issue of \$250,000 bonds authorized for that purpose. The work will be begun as soon as the bonds can be placed on favorable terms.

## Vicksburg &amp; Meridian.

This company owns a line from Meridian, Miss., west to Vicksburg, 140 miles, with an extension to the levee in Vicksburg, 2 miles. The company was reorganized two years ago. The following statements are for the year ending March 31.

The earnings for the year were as follows:

	1882-83.	1881-82.	Inc. or Dec.	P. c.
Earnings	\$495,851	\$309,671	I.	\$186,180
Expenses	354,727	336,253	I.	18,274
Net earnings	\$141,324	\$173,418	D.	\$32,094
Gross earn. per mile	3.492	3.589	D.	97
Net earn. per mile	965	1,221	D.	256
Per cent. of exps.	71.50	65.97	I.	5.53

Taxes are included in operating expenses in both years.

The income account is as follows:

Net earnings for the year	\$141,324
Interest on first and second mortgage bonds	\$93,000
advances	752
Surplus for the year	\$47,572
Balance of reconstruction fund, April 1, 1882	106,157
Total	\$213,729
Reconstruction and improvements	212,694
Balance, April 1, 1883	\$1,035

The reconstruction fund being now exhausted, further improvement must be paid for from net earnings.

The General Manager confidently anticipates that the opening through to Shreveport of the Vicksburg, Shreveport & Pacific Railroad, with which good progress is now being made, will throw a large amount of new business over the Vicksburg & Meridian.

## Montpelier &amp; Wells River.

This company owns a line from Wells River, Vt., to Montpelier, 38 miles. Its report is for the year ending March 31.

The equipment consists of 3 locomotives; 4 passenger, 1 combination and 2 baggage cars; 26 box, 6 stock and 35 flat cars and 1 caboose; 1 snow-plow and 1 wrecking car.

The company has no bonded debt. Its floating debt at the close of the year consisted of \$10,140.44 due for rolling stock and interest on the same; \$3,000 due on real estate and \$15,000 temporary loan, making \$58,140.44 in all.

The earnings and income statement are as follows:

Freight	\$9,494.39
Passengers	23,084.07
Mail, etc.	13,707.81
Total (\$2.586 per mile)	\$36